EARNINGS MANAGEMENT AND LOSS REVERSAL

A thesis submitted for the degree of Doctor of Philosophy

By

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Abstract

This research aims to detect and measure earnings management using a newly modified version of the standard Jones model (Jones, 1991). The standard model is extended to include a measure of discretionary accruals as an additional regressor instead of using the residuals. The variable used to measure discretionary accruals is a composite variable that consists of two components, one that represents the incentive and the other represents the tool of manipulation. The model is applied to detect earnings management in loss reversal companies for listed companies in Jordan and examine the market reaction to the loss reversal. The model is also applied on loss reversal companies for listed companies in the UK and the US.

In chapter three, the new model is applied on listed companies in Amman Stock Exchange (ASE). The ASE is structured into two markets: the first market and the second market. Companies are motivated to be listed or remain listed in the first market since it only lists profitable companies. Companies reporting losses more frequently are listed in the second market. Results provide evidence of earnings management for companies listed in the first market. Companies that report a loss in a previous period manipulate in the following period to report profits. As a result of loss reversal, they preserve their place in the first market and avoid dropping back to the second market. This research conducts statistical simulation tests to compare the extended Jones model with the standard model. Results show that the extended model detects earnings management better than the standard one. This new model also separates discretionary accruals from measurement error (i.e. residuals) and makes it possible to accurately measure the whole amount of manipulation.

Chapter four examines the investor reaction to the manipulation taking place in the first market. Results show that the market is pricing the discretionary accruals (the manipulation) as a component of net income, although they result only from earnings management.

In chapter five, the model is applied on loss reversal firms listed in the UK and in the US. Results show that the companies manipulate to reverse losses and the manipulation depends on to the presence of R&D activities and the changing level in these activities.

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Table of contents:

LIST OF TABLES:

Chapter One

Introduction

1.1 Preface:

Reported earnings play an important role in valuing companies. It is the signal markets intercept and decode to formulate an opinion and translate it into a decision. Earnings are the mirror of the company and the image of the manager.

Managers acknowledge the importance of the income figure, and hold back no effort to maintain a positive figure and avoid a negative one. They also understand that there is some flexibility to construct the earnings number. They use this inherited flexibility in the earnings figure to bend it to any direction to achieve specific targets.

The accrual system allows for some flexibility for estimating some expenses and revenues. Without it, companies will display an earnings figure that varies from period to another. However, the accrual system provides basis for measuring performance more accurately through the revenue recognition principle and the matching principle.

Expenses are usually recognised and recorded first waiting for revenues to occur. Therefore, instead of reporting all expenses in one period and recording all revenues in the subsequent period, the accrual system allows for recognising revenues in the period it is earned and matches it with related expenses. Through proper matching, the performance of the firm is measured more accurately. On the other hand, managers can use the accrual system to manipulate the numbers, and in a way, design the earnings figure to fulfil certain objectives.

Accounting choices also influences the earnings. Managers can change the method of stock valuation (e.g. LIFO to FIFO) to increase (decrease) cost of goods sold to match it with the sales revenue and as a result the operating profit will change accordingly. According to generally accepted accounting principles and methods, any change in the accounting methods must be justified and disclosed. Such changes will have no effect on the market because they are transparent and even anticipated.

On the other hand, accrual manipulation is not transparent and in many instances is undetected, which can mislead the market. Although the market knows that the

accounting earnings figure can be manipulated, but they cannot tell whether it is manipulation or the company is performing well.

To understand exactly how accrual manipulation takes place, consider the following example. A company prepares its financial statements at the end of December; the company estimates the allowance for bad debts to be 10% of its total debtors balances, and 20% of its sales occurred during the second half of December. The manager can report the earnings for the year ended taking no action, assuming the final results are already profits. However, if the manager faces an incentive to decrease reported earnings then he/she can take two actions. First, delay the shipment of sales that occur in the second half of December and ship the goods in early January. Second, re-estimate the bad debt allowance to be 20% instead of 10%. The result of this manipulation is a decrease in sales revenue by 20% and an increase in bad debt expense by 10%, thereby managing earnings downward.

In a different case, the manager might face an incentive to increase reported earnings. Assuming that the company's average sales in January are 15% of total sales every year, the manager can recognise January sales in December by early shipment of goods. The manager can also re-estimate bad debt allowance to be 5% instead of 10%. The result will be an *increase* in sales revenue by 15% for the current year and a *decrease* in bad debt expenses by 5%; overall it's a gross *increase* of 20% to the reported earnings. This manipulation is simply shifting revenues and expenses between two periods, and even if the auditor detects it, the transactions can be easily justified by displaying the sales invoices.

In the two cases demonstrated above, the manager did not violate any regulations or any accounting standards. Hence, in its abstract form earnings management is not fraudulent. But taking into consideration the manager's intensions, it is not ethical. The manager manipulated earnings as a reaction to a specific incentive or stimuli. Regardless the incentive or whether it is related to the well-being of the manager or the company itself, the reported earnings does not reflect the true performance of the firm.

1.2 The aim and objectives of this research:

The general aim of this research is to modify an extensively used model in literature in order to detect and measure earnings management more accurately. Moreover, showing how the new model overcomes the weaknesses and problems documented in previous approaches.

The objectives of this research are firstly to provide general review of the earnings management literature to explain the main methods and models applied to detect and measure earnings management. Additionally, identify the main gaps and weaknesses in previous studies. Also, highlight the main problems with the cross-sectional Jones model. Another objective is overcoming the weaknesses of previous models by introducing a new modified model that detects and measures earnings management more accurately. Furthermore, demonstrating how the model detects earnings management by applying it on real data taken from listed companies in Jordan, the UK and the US.

1.3 Contributions of the research:

The main contributions of this research are summarized as follows:

I. I develop a new model that detects and measures earnings management more accurately. The new model is an extension of the cross-sectional version of the Jones model. This new model uses a variable that detects manipulation and measures the amount of the manipulation for companies that share a common motivation.

II. I conduct a full review of previous research in earnings management literature. This review examines the main methods that are applied to detect earnings management. The review clusters the studies that use similar methods into three groups: studies that estimate discretionary accruals, studies that detect earnings management through earnings distribution, studies that estimate the managed component of a single accrual.

III. I provide evidence of earnings management for listed companies in Amman Stock Exchange. Industrial companies listed in the first market manipulate in order to avoid relegation. Moreover, I show that the market does not detect this manipulation and overreacts to the discretionary accruals.

IV. I provide evidence of earnings management for loss reversal companies that undertake R&D activities in the UK and in the US. The amount of manipulation varies according to the changing level of the R&D activities.

1.4 Review of earnings management literature:

Detecting earnings management is not an easy task. So the question stands on how a researcher can study this behaviour and reject the null hypothesis of no earnings management? Many approaches are used in previous studies, and the starting point is to understand the incentives and motives driving this behaviour. Taking this incentive into consideration puts earnings management in context and makes it easier to detect and measure. Therefore, instead of looking for a needle in a hay stack, researchers narrow down the search based on the incentive.

There are three main approaches applied in literature to detect and measure earning management. The most applied approach is estimating discretionary accruals after controlling for nondiscretionary accruals. Another popular method is examining the earnings distribution shape and looking for any discontinuities around specific benchmarks. A third approach, although less applied than the other two, is examining single accruals to separate the managed component from the unmanaged component.

To estimate the discretionary accruals, previous studies develop models to control for the nondiscretionary accruals. If there is no earnings management, then total accruals will equal nondiscretionary accruals. On the other hand, if there is a difference between them, then the unexplained amount is attributed to discretionary accruals (Healy, 1985; DeAngelo, 1986).

Jones (1991) develops a model to control for nondiscretionary accruals more accurately than previous studies. The model contains two variables (sales revenue and fixed assets)

that control most of the nondiscretionary accruals. When total accruals are regressed on these two variables any resulting residuals are attributable to discretionary accruals. This model is the most applied model in earnings management studies. The model developed by Jones (1991) is applied on two periods: the estimation period and the event period. In the estimation period, the model is used to estimate the coefficients on the two nondiscretionary accruals variables using time series data. The estimated coefficients are then plotted in the event year to compute total accruals. If there is no earnings management, then there will be no difference between the observed total accruals and the computed total accruals. However, any difference between the two amounts is earnings management.

Following studies applied the Jones model on cross sectional data in order to overcome the lack of accounting time series data (DeFond & Jiambalvo, 1994; Subramanyam, 1996; Becker et al., 1998; Kothari et al., 2005; Caramanis & Lennox, 2008). The model is applied on the whole sample of firm-years observations. In other words, the cross-sectional Jones model does not have an estimation period and an event period. Therefore, the residuals of the model are the measure of discretionary accruals.

The distribution approach detects earnings management by examining the earnings distribution. The presence of a discontinuity in the distribution around a specific benchmark is considered earnings management (Hayn, 1995; Burgstahler &Dichev, 1997; Degeorge et al., 1999; Leuz et al., 2003; Jacob &Jorgensen, 2007). This approach gains its importance from setting the main incentives or benchmarks for earnings management.

Some studies apply an approach to specify the managed component of specific single accruals (McNichols &Wilson, 1988; Knag &Sivaramakrishnan, 1995; Beaver &Engel, 1996). The importance of this method comes from differentiating between the unmanaged and managed components of specific accruals.

1.5 A modification to the Jones model:

When applying the Jones model on cross-sectional data, the residuals are used as the measure for discretionary accruals. However, the residuals from a statistical perspective are assumed to be normally distributed around the regression line. Therefore, some residuals are above the line and some residuals are below the line, and they average to zero. Based on that, the residuals show that some firms are managing earnings upward, while at the same time other firms are managing earnings downward, and on average there is no earnings management.

In previous studies, the Jones model is modified to increase the control over the nondiscretionary accruals. For example, Dechow et al. (1995) modify the model by removing the change in debtors from change in sales in the event period. By doing so, the paper argues that the model will only control for the nondiscretionary accruals by removing any managed components. Kothari et al. (2005) adds an additional variable to control for firm performance effects, making the model less noisy. On the other hand, Teoh et al. (1998) modify the model based on time length and management control.

The underlying argument of the modifications is if the Jones model measures the nondiscretionary accruals more accurately, then the noise to the model will represent only the discretionary accruals. However, the Jones model is not the best fit for the nondiscretionary accruals. In other words, the model does not give a R^2 score that equals 1. Therefore, the residuals are picking up unobserved nondiscretionary accruals and measurement errors in addition to discretionary accruals.

To overcome this problem, the modification to the Jones model should not be based on better control for nondiscretionary accruals but on measuring the discretionary accruals themselves. Hence, the argument of this research is assuming that the change in sales revenue and fixed assets are controlling for most of the nondiscretionary accruals, and adding an additional variable that represents discretionary accruals. The residuals in this case will only represent measurement error or white noise. Thus, the model will be based on the fact that total accruals are decomposed into nondiscretionary and discretionary:

Total accruals= nondiscretionary accruals + discretionary accruals

And will be tested empirically using the following general model:

The error term in this model will only represent white noise. The measure of discretionary accruals is composed of two variables. The first one represents the incentive (or benchmark) that motivates managers to manipulate earnings. The second variable represents the tool of manipulation. Thus, the measure of discretionary accruals in this model explains the "why" and the "how".

1.6 Sample, data and results:

The model is first applied on firms listed in the Amman Stock Exchange (ASE). The institutional framework of the ASE makes it an interesting case because the incentive to manipulate is visible. The ASE is divided into two markets: the first market and the second market.

Firms that report continuous profits are listed in the first market. However, if a company reports losses for three consecutive years, then it will be removed from the first market to the second market. This will affect the reputation of the company and the manager. To be listed in the second market means that the company is less profitable, and therefore more risky. This will also affect the companies access to additional funds whether from the market or from lenders.

The sample consists of all industrial or manufacturing companies listed in the first market. Financial and service companies are dropped from the sample because of their special accounting systems. As a matter of fact, the majority of previous studies in earnings management are applied on manufacturing firms due to the availability of accrual accounts, which makes the detection of any manipulation less difficult. Based on that, companies listed in the first market are motivated to manipulate their earnings in order to remain listed. The assumption is companies listed in the first market will manipulate directly after a loss year. They will not manipulate after two consecutive years of losses because it will be more costly to do so.

The tool of manipulation depends on the available accounting technology. Since the sample consists of industrial companies listed in the first market, the accrual accounts are expected to be used to manipulate earnings (e.g. debtors, stock). For the industrial

companies listed in the first market, change in debtors is the variable used along with the incentive to measure discretionary accruals. Change in debtors can capture both revenue and expense manipulation. Companies can increase sales revenue through early recognition of sales. For example, a portion of sales at the beginning of the following year can be recognized during the current year by shipping the goods early to buyers. This process is called channel stuffing. Moreover, the company can re-estimate the percentage of bad debts to decrease expenses. It is possible to achieve these two actions simultaneously.

The results obtained from applying the model on the sample support the earnings management hypothesis. The model detects earnings management for industrial companies listed in the first market. Companies that report a loss are manipulating their earnings through early recognition of sales and/or decreasing the bad debt expense.

The manipulating companies are examined in the loss year to test for big baths. Companies usually take a big bath by accelerating some expenses and writing-off stock to increase the probability of reporting profits in the following year. In other words, the company anticipating a loss will maximise the loss making it easier to report profits in the next period. However, companies might realise that they will report losses at the end of the fiscal year and it could be too late for them to either manipulate their earnings or take a big bath. Results show no indication of big bath in the loss year. This means that companies decided to take action in the period following the loss and manage earnings upwards through early recognition of sales. This action will most likely affect the level of sales in the year following the manipulation. Results show that change in sales is significantly negative in the period following the manipulation year, which is an indication of accrual reversal.

In order to compare the model of this research with the standard Jones Model, a statistical simulation is designed. The basis of the comparison is demonstrating how the residuals are not the proper measure for discretionary accruals. Previous studies conduct simulations demonstrating the behaviour of the residuals after adding a fixed amount that represents earnings management.

The standard Jones model is applied on the ASE sample after dropping off the companies with the incentive to manipulate. The coefficients of the model are set so that

the standard Jones model will give a R^2 equal to 1. After that, a fixed amount (e.g. 5% of total assets) is inserted on the data. Using the residuals from the standard Jones model did not pick up all the manipulation. However, when adding a variable as an additional regressor to represent the discretionary accruals, the coefficient equals the amount added. In other words, the variable is picking up all the manipulation. Thus, the simulation test demonstrates how the modified model measures earnings management more accurately than the residuals.

Companies listed in the first market in the Amman Stock Exchange manipulate their earnings in the period following a loss year in order to remain listed. But the question is if the manipulation is successful to preserve the companies' status in the first market, is it misleading the investors. Previous studies examined the components of earnings and how the market prices each part. The underlying issue the studies are testing is the information content of total accruals. Accruals, if not managed, should carry relevant information about the real performance of the company. However, the manipulation will add noise and distort the actual performance of the company (Dechow, 1994; Subramanyam, 1996; Sloan, 1996; Xie, 2001; DeFond &Park, 2001; Pincus et al., 2007)

Net income (earnings) is decomposed into its basic components: operating cash flows and accruals. The latter is decomposed into nondiscretionary and discretionary accruals, or in other words, the unmanaged and managed components (Dechow, 1994; Subramanyam, 1996). The assumption tested here is if the market sees through the manipulation then they will only price the operating cash flows and the nondiscretionary accruals. On the other hand, if the market is actually misled by the manipulation, then they will price discretionary accruals as a component of earnings.

To test this, the market value of shares is regressed on the components of earnings in three separate univariate regressions. Moreover, the different forms of earnings (e.g. nondiscretionary income) are regressed in four separate multivariate regressions. The reason behind these tests is to examine the coefficients and the R^2 of each model and determine which component is priced the highest (Subramanyam, 1996).

Model selection tests are applied using the likelihood ratio test (Vuong, 1989). The test shows which model of the competing models is the best in explaining the dependent variable (i.e. market value of shares). Results show that the market is pricing

discretionary accruals. They are the same discretionary accruals detected using the extended Jones model in the previous chapter and they only represent earnings management. Moreover, the results also show that any form of earnings explains more of the market share value when it includes discretionary accruals. For example, net income is explaining more than nondiscretionary income (operating cash flows plus nondiscretionary accruals). The results also show that the market not only prices the discretionary accruals but attaches a higher value to them than the other two components. This means that the manipulation is not only preserving the status of the company in the first market but also sending an optimistic message to the investors about its current and future performance. However, and once again, the discretionary accruals are the result of only earnings management.

In order to test the modified model of this research in different settings, the model is applied to detect earnings management for loss reversal firms. The incentive in this case is reversing losses reported in previous period and reporting profits in the current period.

The *status quo* for companies is to report profits, but if they report losses, then it is considered as a deviation. The market usually places severe penalties on loss making firms by pricing the company negatively. However, if the reason for losses are due to investing in projects with potential future benefits (e.g. R&D activities), then the company will be positively valued regardless the losses.

Previous studies in this area examined the reasons for losses and how the market interacts with loss firms. All the studies document an increase in the frequency of firms reporting losses in the past three decades. They mostly attribute this to more conservative accounting standards and as a result, an increase in loss recognition. Moreover, the literature shows that if the reason for the loss is to increase the value of the firm in the future, then the market will value the activity rather than the loss itself (Collins et al., 1999; Givoly &Hayn, 2000; Joos & Plesko, 2005; Klein &Marquardt, 2006; Darrough &Ye, 2007; Franzen &Radhakrishnan, 2009).

In this context, the focus is on R&D firms since the literature shows that the market prices R&D as assets with potential future benefits despite that the firm reports losses. R&D activities are viewed by the investors as potential future benefits that will

eventually increase the value of the firm. In other words, the company that undertakes R&D projects will continue to report losses, but at some point the market expects that the company will reverse its losses by harvesting the benefits of previous R&D activities.

The model is applied on two samples from the UK and from the US. The two samples also represent two different accounting regimes and provide comparability for loss firms' between two settings. The sample includes only manufacturing firms because of the intensive accrual accounts evident in their financial reports. Results show that loss firms that undertake R&D activities in the UK reverse losses through earnings management, and the tool of manipulation is stock (inventory). Stock is a proper tool for expense manipulation. Since all firms in the sample are manufacturing companies, then they can reduce the cost of manufactured goods through re-allocating overhead costs to increase ending period stock. Moreover, results show evidence of earnings management for loss reversal firms in the US that undertake R&D. The manipulation is captured through change in debtors; this suggests that firms are recognising early sales to increase earnings.

The results also show that for loss firms that undertake R&D activities at a changing state are reversing losses through earnings management. Firms that have a variable level of R&D cannot cover their current level of R&D from benefits they receive from previous activities. Therefore, they have a higher incentive to manipulate compared to firms that invest in R&D at an unchangeable rate. It is expected that Firms investing in R&D at a steady state can cover their current level of R&D with the benefits they receive from previous investments.

Overall, these results show that firms with R&D activities are more motivated than other firms to reverse their losses through earnings management. These firms take advantage of the market for pricing their R&D operations favourably. Hence, they show profits from time to time in order to send a signal to the market that some R&D is starting to pay-in the expected benefits, although the profits are a result of earnings management.

To summarise, this research modifies the Jones model by adding an additional regressor to measure discretionary accruals and having the residuals only represent white noise.

The model is applied on three different samples operating in different institutional frameworks. Moreover, the statistical simulation tests show that the modified model of this research detects earnings management more accurately than the standard version.

1.7 Chapters outline:

This research is organised into six chapters as the following:

Chapter two: provides a review to the earnings management literature to examine the previous methods and models applied to detect earnings management. The review highlights the weaknesses in the previous models in order to identify the gaps. The studies reviewed are decomposed into three sections based on the methods applied to detect and measure earnings management. This chapter is also relevant to the literature review for chapters four and five. Moreover, a modification to the Jones model is developed in the second part of this chapter. The weakness of the Jones model when applied on cross-sectional data is emphasized and the justification to modify and extend the model is explained.

Chapter three: in this chapter the Amman Stock Exchange (ASE) is described in detail. The development and the structure of the market are described and examined, and pointing out the incentive behind earnings management for listed companies. Additionally, the chapter presents the results for applying the extended Jones model on a sample of listed companies in the ASE. The second part of this chapter provides statistical simulations to compare the modified model of this research with the standard Jones model. The simulation tests point out the strengths of the modified model and how it is better at detecting and measuring earnings management.

Chapter four: this chapter is considered an extension to the results documented in chapter three. The chapter starts by reviewing the literature relating to pricing accruals and its affect on the share price. It focuses on examining how the market prices the basic components of earnings. The main focus here is to examine whether the market prices discretionary accruals. The chapter also provides statistical tests for non-nested model selection. This is to demonstrate which component of earnings is the most priced.

Chapter five: this chapter focuses on detecting earnings management for loss reversal companies. It starts by reviewing the relevant literature on loss firms. The model is

applied on two new samples from the UK and the US. The focus is to apply the model on different firms with different incentives to manipulate earnings.

Chapter six: this chapter summarises the main findings of this research, it also highlights the main contributions. The chapter also shows the limitations of this research ending with suggestions for future research.

Chapter Two

Literature review on earnings management studies and model development

2.1 Introduction:

Detecting earnings management is not an easy task. So the question stands on how a researcher can study this behaviour and reject the null hypothesis of no earnings management?

Many approaches are used in previous studies, and the starting point for all of them was to understand the incentives and motives driving this behaviour. Taking this incentive into consideration puts earnings management in context and makes it logical, so instead of looking for a needle in a hay stack, researchers narrow down the search based on the incentive. Past research looked for earnings management on the sector level (i.e. whole industry) rather than on the individual firm level. The incentive must apply to the industry as a whole, and the detection process begins with examining the reaction of the industry to this stimulus, and if any anomalies are found it will be attributed to earnings management. This procedure makes absolute sense, but looking for upward earnings management while assuming that a large number of other firms are manipulating downwards makes the detection process even more difficult. Therefore, researchers must look only into incentives that drive firms to manipulate in the same direction.

Researchers study the level of accruals for detecting earnings management. They differentiate between two levels, the normal level which relates to nondiscretionary accruals, and the abnormal level which relates to discretionary accruals. The normal level of accruals (nondiscretionary) is not affected by management's judgment, but rather, they are affected by the economic circumstances and environment surrounding the company. The discretionary accruals change according to management's decisions and personal judgment. Thus, earnings management is detected and measured by examining the discretionary accruals.

In this chapter, the literature of earnings management is reviewed. Studies are grouped into three groups based on the approach used. The second part of this chapter explains the model development used in this research.

2.2 An overview of previous studies in earnings management:

According to Healy and Wahlen (1999) earnings management is the use of judgement in financial reporting and structuring transactions to mislead stakeholders about underlying performance about the company and/or to influence contractual outcomes that depend on accounting numbers.

The exercise of judgement is an essential part of the accounting system, since some expenses and revenues must be recorded based on the best judgement of the decision maker. This process gives rise to what are known as accruals, which are the outcomes of the matching principle and the revenue recognition principle. In each period companies must report their results for the ended fiscal year, therefore any revenues and expenses relating to that year must be recorded, regardless whether they are received or paid in cash. Therefore, managers can shift revenues and expenses from a period to another, increasing or decreasing reported earnings.

Minimizing the manager's control over some accounts, hence reducing the judgement exercised in financial reporting makes the earnings figure less informative, because some expenses and revenues that relate to the period will not be recorded. The cash flow figure on the other hand, is much less controlled by managers, but can investors rely on it for decision making? According to Dechow (1994) realized cash flows suffer from matching and timing problems, making it lose its informative attribute, and since accruals reduce matching and timing problems, they reflect more accurately the firm's performance. But Dechow (1994) also points out that excess accrual manipulation can make it less informative, hence realized cash flow becomes less preferable.

There are two main approaches in the literature detecting earnings management. Most studies in earnings management depend on one of these two approaches. The first approach is the accrual approach (or discretionary accruals approach); previous studies using this approach estimates discretionary accruals by applying time-series models or cross sectional models and examining the residuals. The second approach is the earnings distribution approach (or the threshold approach) where earnings management is detected by examining the discontinuity in the earnings distribution around a specific benchmark or threshold. There is also a third approach that examines single accruals to manipulate reported earnings, but this approach is less popular among researchers.

2.2.1 Studies using estimates of discretionary accruals:

There are two approaches used to estimate discretionary accruals in literature, the first group of studies applies a time-series approach, the second group applies a cross-sectional approach. The latter is now dominating the earnings management literature.

Time-series approach:

Healy (1985):

This paper tests the association between manager's accruals and accounting procedure decisions and their income reporting incentives under bonus plans. The study shows that managers are not always selecting income increasing decisions. In some cases when earnings targets are not met regardless the accounting decision, managers select income decreasing choices to increase the probability of meeting targets next year, this process is called "big bath" which is achieved through reducing current revenues or accelerating write offs.

Two classes are presented; accrual tests and changes in accounting procedures tests. Healy (1986) defines accruals as the difference between reported earnings and operating cash flows. The sign of accruals are compared with the predicted sign for a particular company and year, given the managers bonus incentives. The accounting earnings are decomposed into cash flows from operations and total accruals (TA). Furthermore, total accruals (TA) are decomposed into non-discretionary accruals (NDA) and discretionary accruals (DA). Healy (1985) measures accruals management by examining the average of (TA) prior to a particular period (event year) compared to the (TA) in the event year:

The non-discretionary accruals are adjustments to cash flows mandated by accounting standard-setting bodies, the discretionary accruals on the other hand are adjustments to cash flows selected by managers. Managers choose discretionary accruals from an opportunity set of generally accepted procedures defined by accounting standard-setting bodies. Discretionary accruals enable managers to transfer (shift) earnings between

periods because accruals modify the timing of reported earnings. Healy assumes that discretionary accruals sum to zero at the end of managers employment horizon.

Healy (1985) also shows that accruals are not always available to manipulate, because they are limited by the available accounting technology. This can be generalized to the industry level, since most earnings management studies are applied on industrial sectors more than on financial sectors. Therefore manager's ability to manipulate is constrained or limited from firm to firm and from an industry to another.

DeAngelo (1986):

This paper examines earnings manipulations in cases of management buyouts. The study argues that since courts and investment bankers rely on the firm's historical earnings as a measure of fair value to evaluate buyouts compensation rather than market price, then it serves as an incentive for managers to understate earnings to reduce the buyout compensation. Although managers do offer a reasonable premium above the market price, but it is still inadequate because the market price does not fully reflect management's inside information.

DeAngelo (1986) provides a number of opportunities through which managers can manipulate earnings; accelerating expenses, estimating some expenses upwards, taking direct write-offs and deferring profitable projects. The paper also shows that managers have some limitations to manipulate. For example, managers do not have the ability to delay profitable projects because they could be taken by competitors. Furthermore, shareholders can hire financial experts to detect manipulations and convince other bodies of its importance, thus is also another constraint on managers ability to manage earnings.

DeAngelo (1986) ignores these limitations and argues that although there are several forces that constrain or limits manager's ability, it will never eliminate their incentive to do so. In other words, the incentives are always higher than the limitations and managers will always find new ways to manipulate. However, the paper states that managers facing theses limitations will look for less obvious accounting techniques.

DeAngelo (1986) tests accruals by observing feasible set of accounting choices available to managers that would have caused decreases in the reported earnings. The

study uses a similar approach to Healy (1985), which is a proxy variable to observe earnings in the absence of manipulation. But unlike Healy (1985) this study assumes that if nondiscretionary accruals are large relative to total accruals, then the latter becomes a poor measure for the extent of earnings management.

DeAngelo (1986) expects that total accruals are normally negative because depreciation expense is a major component of accruals and in any period deprecation is probably nondiscretionary. The paper compares total accruals in the event year with the total accruals in the previous year, and any abnormal changes are considered systematic earnings management. This approach assumes that changes in nondiscretionary accruals are zero. So, if there is any change in total accruals between year (t) and year (t-1), then that reflects a significant average change in discretionary accruals. Based on that, nondiscretionary accruals are modelled as the following:

$$NDA_t = TA_{t-1}$$

Similar to Healy (1985), DeAngelo (1986) defines accruals as the difference between net income and operating cash flows. The tests are rested on the assumption that change in nondiscretionary accruals are approximately zero. Therefore, a significant average decrease in total accruals reflects a significant average decrease in discretionary accruals. The tests for accruals changes employ a firm specific benchmark accrual rather than a cross-sectional one, because the managers who propose a buyout probably differ on important dimensions from the managers who find it advantageous to remain publicly held.

DeAngelo (1986) did not find any evidence for systematic reduction in total accruals; the reason is there are only subsets of managers that have sufficient accounting discretion to understate earnings by significant amounts.

Jones (1991):

This paper uses a total accruals approach to estimate the discretionary component of the total accruals to measure earnings management. The reason behind using the total accruals approach is that managers are more likely to use several accruals to reduce reported earnings.

Jones (1991) develops a firm-specific expectations model to estimate normal (non-discretionary) accruals using the longest time series of available data to control for the effects of economic conditions on the level of accruals:

$$\frac{TA_t}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_t}{A_{t-1}}) + \gamma(\frac{PPE_t}{A_{t-1}}) + \varepsilon_t$$

Where:

TA: total accruals, change in non-cash working capital before income taxes payables less depreciation expense

ΔREV: change in revenue scaled by total assets at t-1

PPE: property, plant and equipment scaled by total assets at t-1

A_{t-1}: Total assets at t-1, which is used to scale all variables to reduce heteroskedasticity.

The estimated coefficients α, β and γ from the estimation period are used in the event year (the year where earnings management is expected to take place) to compute total accruals in that year (TA^*), the discretionary accruals are therefore:

$$DA_t = TA_t - TA^*_t$$

Jones (1991) conducts a cross-sectional analysis after that to test whether the estimated discretionary accruals (DA_t) tend to be income decreasing during import relief investigations period. The discretionary accruals are assumed to be zero in the estimation period.

The problem with this model is the limited number of time series observations used to estimate the coefficients. Another weakness Jones (1991) acknowledges is change in revenue during the estimation period may contain a managed component. The paper also acknowledges that there are conflicting incentives in the same period whether to increase or decrease earnings. However, the paper argues that income decreasing incentives are greater within the same period. Another related problem, which the paper states clearly, is the free-rider problem. That is, the grant relief is granted to all producers within an industry. Therefore, some producers may not manage their earnings

downward at all, other producers might even manage upwards to fulfil compensation plans and/or debt covenants restrictions.

To overcome these issues, Jones (1991) is based on a sample that includes only petitioners, who have a greater incentive to maximise the probability of obtaining the import relief. Thus, petitioners have greater incentives to manage earnings during import relief investigations.

Nonetheless, there are limitations the paper could not overcome. The International Trade Commission (ITC) does not adjust the reported accounting numbers, and not all managers are aware of this practice, those who believe the numbers are adjusted may not use accounting choices to manage earnings. Furthermore, some companies may be doing badly already and need not to manipulate earnings. Other companies may rely on cost allocation methods rather than accrual manipulation to reduce earnings. All these limitations affect the power of the test to detect earnings management.

The results Jones (1991) obtained are consistent with the earnings management hypothesis during the investigation period. The study is extended even after the investigation period (i.e. in t+1, t+2 and t+3), to detect the reversal of any income decreasing accruals made in the period under investigation. However, the results show no evidence of that occurring. Following the breakthrough Jones (1991) accomplished, many authors use this model to detect earnings management.

Dechow et al. (1995):

This paper argues that the Jones model produce low power tests and detecting earnings management is still difficult. The paper focuses mainly on finding the most powerful test used in literature to detect earnings management.

According to the findings, neither test is superior since all of them produce low power of economically plausible magnitudes, although all models appear to be reasonably well specified.

Dechow et al. (1995) also introduces a modified version of the Jones model. The change in sales revenue variable is modified by deducting the change in debtors because managers have no (or little) control to manipulate cash sales relative to credit sales. The

modification to the Jones model produces a slightly more powerful test. The process is the same as Jones (1991) for the estimation period in estimating the coefficients, but in the event period the change in revenue is adjusted for change in receivables (debtors):

$$TA_t = \alpha_1(\frac{1}{A_{t-1}}) + \alpha_2(\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}}) + \alpha_3(\frac{PPE_t}{A_{t-1}}) + \nu_t$$

where ΔREC is the change in receivables (debtors).

In other words, the modified Jones model assumes that all credit sales (debtors) in the event period result from earnings management. Thus, earnings management is the difference between the estimated total accruals and the observed total accruals at time t (the event year).

The modified version of the Jones model did not fix the problem with the required time series observations needed to accurately estimate the coefficients, and by using time series data, the possibility of the model to be miss-specified is higher due to non-stationary. Another problem with time-series approach is the implicit assumption that, prior to the event year, there is no earnings management, and that nondiscretionary accruals are stable or unchangeable. Therefore, a cross-sectional version of the Jones and modified Jones models are becoming the dominant approach in the earnings management literature. The cross sectional approach generates larger samples, and increases the precision of estimates because of higher number of observations. (DeFond & Jiambalvo, 1994; Subramanyam, 1996; Peasnell et al., 2000)

<u>Cross-sectional approach:</u>

DeFond and Jiambalvo (1994):

This paper is the first study to develop and implement the cross-sectional version of the Jones model. The results indicate that in the year prior to debt covenant violation abnormal (discretionary) accruals are significantly positive, which supports by itself the traditional view that debt agreements usually motivate mangers to manipulate reported earnings.

DeFond & Jiambalvo (1994) major contribution is testing the Jones model based on cross-sectional data, although the Jones model is applied using time-series data as well,

both tests generate similar results and support the hypothesis of upward earnings management. Additionally, another contribution of this paper is using two different measures of accruals that are widely used in literature. The paper applies time series and cross-sectional tests using firstly total accruals, which equals the difference between net income and operating cash flows. Secondly, using working capital accruals computed as the sum of changes in debtors, stock and other current assets less the sum of changes in creditors, tax payables and other current liabilities.

The estimates of the two measures of accruals are similar under the times series and cross-sectional tests. The only difference is excluding property, plant and equipment from the Jones model when using the working capital accruals. The implication of DeFond & Jiambalvo (1994) for earnings management literature is providing evidence that, despite the different measures of total accruals or different methodologies to detect earnings management, the results obtained are similar. This provides more flexibility for researchers, especially in the presence of insufficient data, to examine earnings management. It also avoids the assumption of coefficient stability when using time series tests and as mentioned earlier, generating larger samples by applying cross-sectional tests. Following this paper, cross-sectional tests are now widely used in the literature.

Subramanyam (1996):

This paper examines if the stock market priced discretionary accruals. Accruals earnings are superior to cash flows in terms of performance measurement, especially in short intervals because it mitigates timing and matching problems. However, the paper argues that this superiority is not because of, or despite, management's discretionary accruals. The discretionary accruals are estimated by applying the Jones model on cross-sectional data. The results indicate that discretionary accruals are (on average) priced by the market.

Subramanyam (1996) runs univariate regressions between returns and net income, nondiscretionary income and operating cash flow and shows that net income performs better than nondiscretionary income. Furthermore, net income performs better than cash flow from operations which is attributable to the discretionary component. The paper

documents that the discretionary component on income has incremental information content beyond the nondiscretionary component.

An interesting point Subramanyam (1996) makes is, while opportunistic earnings management occur in specific situations, the evidence suggest that on average earnings management does not occur. This result is driven from the fact that the residuals from the Jones models, which represents discretionary accruals, average to zero, indicating that there is no earnings management. Therefore, an important issue that must be taken seriously when applying the cross sectional version of the Jones model is inserting a new variable to estimate discretionary accruals rather than the residual term.

Studies in earnings management usually focus on the incentives behind such behaviour. In the presence of any kind of motivation, firms have equal opportunity and ability to choose the accounting adjustments to increase or decrease reported earnings, and this is far from true. While there is usually a general incentive that could motivate firms to manipulate earnings in the same direction, they do not necessarily have the same ability to do so.

Becker et al. (1998):

The paper examines the relation between audit quality and earnings management. The paper argues that big six auditors provide better audit quality which places a restrain on the firms' ability to manipulate. This assumption is based on evidence from previous studies documenting that big six auditors provide better audit quality because they are larger than their competitors.

The focus in this study is on income-increasing earnings management because non-big six auditors will allow their clients to overstate their earnings more than the big-six. The likelihood of auditors being sued for allowing clients to overstate earnings is much higher than being sued for understating earnings. Therefore, big six auditors will put more effort in the audit process to maintain their image and reputation. The study focuses on detecting income increasing accruals because evidence from other studies suggests that managers are more likely to overstate than understate their earnings. Discretionary accruals are estimated using a cross-sectional version of the Jones model. The results support the papers argument that companies with non-big auditor's report higher discretionary accruals than companies with big-six auditors. This is consistent

with the hypothesis that external auditors constrain managers' ability to manipulate earnings. Another interesting result this paper shows is that variation in discretionary accruals for companies with non-big six auditors is significantly larger which reflects the accounting flexibility that auditors allow.

Francis et al. (1999):

The paper examines high-accrual firms incentive to hire a big six auditor to provide assurance that reported earnings are credible. The interesting argument of this study is managers of firms that have greater scope for opportunistic earnings management, choose by their own will to hire a big six auditor to restrain their ability to manipulate. Thus, provide assurance to different stakeholders of the credibility of reported income.

Francis et al. (1999) finds that firms with greater propensity to generate accruals are more likely to hire big 6 auditors, and as a result, have smaller amounts of discretionary accruals. The paper compares the discretionary accruals of big 6 audited firms with those from non-big 6 audited firms. Discretionary accruals are estimated using a cross-sectional Jones model.

Francis et al. (1999) could be the first and only (to the best knowledge of the researcher) that documents an incentive not to manipulate. A possible explanation is that these firms are already doing well and do not need to manipulate their earnings because all the incentives of the firm and the manager are fulfilled. The company needs to communicate to outsiders that the company is really doing well and reported income is an accurate measure of true performance. This is actually one of the criteria of choosing the sample in the study, only the companies that have value for sales greater than zero are included.

The results can be used as evidence that the percentage of non-manipulators is much higher than manipulators, which could make the detection of discretionary accruals much easier. Previous studies implicitly and explicitly assumed that incentives to manipulate triggered most firms (if not all) in the same industry to manipulate. However, and based on the results of this paper, one must detect earnings management only in firms that has certain characteristics that would lead them to manipulate in the same direction, but taking into account that not all manipulators share equal ability or opportunity to manage their earnings.

Teoh et al. (1998):

This paper proposes a modification to the Jones model; it decomposes accruals into four categories jointly by time period: current and long term; and manager control: discretionary and nondiscretionary.

As in Jones (1991), Teoh et al. (1998) uses an estimation period, which only include the non-issuers firms, and an event period, which is the period of seasoned issues for the issuers firms only. Total current accruals are modelled as an intra-industry cross-sectional regression according to manager control for each year in the estimation period:

$$CA_{jt} = \alpha_0 + \alpha_1(\Delta REV_{jt}) + \varepsilon_{jt}$$

Where CA_{jt} is current accruals (or working capital accruals), ΔREV_{jt} is the change in sales revenue for firm j in period t. All variables are deflated by total assets from (t-1). The nondiscretionary current accruals are modelled in the event period using the estimated coefficients from the estimation period to represent the portion of current accruals resulting from firm sales growth, and it is independent of management discretion:

$$NDCA_{it} = \acute{\alpha}_0 + \acute{\alpha}_1 (\Delta REV_{it} - \Delta REC_{it})$$

Where $NDCA_{it}$ is the nondiscretionary current accruals and ΔREC_{it} is the change in debtors and it is subtracted from sales revenue because of possible manipulation of credit sales. This approach is similar to Dechow et al (1994) that all credit sales in the event period result from manipulation, the difference here is its estimated based on managerial control in the short term. Therefore, the discretionary current accruals (DCA_{it}) are the managed portion of current accruals:

$$DCA_{it} = CA_{it} - NDCA_{it}$$

The difference between the computed nondiscretionary current accruals and the observed current accruals (i.e. the residuals) represent earnings management. Similarly, long term accruals are modelled according to managers' control, but using total accruals (TA) instead of working capital accruals and including property, plant and equipment because long term accruals are affected by long term assets:

$$TA_{it} = \beta_0 + \beta_1(\Delta REV_{jt}) + \beta_2(PPE_{jt}) + \varepsilon_{jt}$$

All variables are scaled by total assets from previous period. The estimated coefficients are then used in the event period to compute the nondiscretionary total accruals (NDTA) in the event period:

$$NDTA_{it} = \hat{\beta}_0 + \hat{\beta}_1(\Delta REV_{it} - \Delta REC_{it}) + \hat{\beta}_2(PPE_{it})$$

The change in debtors is subtracted to allow for credit sales manipulation. This model assumes that manipulation is more evident in the short term accrual than in long term accruals. The discretionary total accruals (DTA) are computed as before:

$$DTA_{it} = TA_{it} - NDTA_{it}$$

Peasnell et al. (2000):

The paper develops and tests a new cross-sectional model, labelled the margin model. The study argues that since previous evidence suggests considerable imprecision in the estimation of discretionary accruals in time series models, cross-sectional models are used extensively in most papers. Furthermore, the paper states that cross-sectional versions of the standard Jones and modified Jones models dominate the literature because of the restrictive quality inherited in the time series approach, which is the need of long time series of data to allow effective estimation for the regression parameters.

Working capital accruals (WCA) are used instead of the total accruals (TA) in the margin model. The model also excludes deprecation from the model due to its visibility as a technique for manipulation:

$$WCA_i = \lambda_0 + \lambda_1 REV_i + \lambda_2 CR_i + \eta_i$$

Where:

REV: total sales.

CR: total sales less change in trade debtors

And λ_0, λ_1, λ_2 are the regression coefficients

Peasnell et al. (2000) evaluates three models (the Jones model, the modified Jones and the margin model) by applying them on cross-sectional data from a sample of firms from the UK. This paper tests empirically the specification and the power of the standard Jones and modified Jones and margin models. The standard Jones and modified Jones are formulated using working capital accruals to ensure comparability with the margin model. The cross-sectional approach basically estimates regression separately for each industry-year combination as the first stage, after which the resulting industry and time specific parameter estimates are combined with firm-specific data to generate estimated discretionary accruals, i.e. the resulting residuals represent earnings management. According to the paper, cross-sectional tests reduces time effects such as interest rates and other macroeconomic factors, and limits the influence of particular instances of unobservable earnings management, but it introduces noise into the parameter estimation to the extent firms differ structurally within the industry. The specification is tested by estimating the first stage regressions for each of the three models for each industry group in a specific year, then selecting 25 firms randomly from that year and constructing an indicator variable (PART) being 1 if the firm is selected, 0 if otherwise.

The following step is randomising all observations in that year and computing the abnormal accruals for each model using the coefficient estimates obtained previously, then estimating the model for each measure of abnormal accruals and test whether the estimated coefficient on (PART) is significantly different from zero. The power of the models is tested similarly, except in the second step a pre-determined positive amount is assigned to reported accruals for firms where (PART) equals 1.

The results show that although all three models are well specified, the margin model is better specified when cash performance is extreme. The Jones and modified Jones models are more powerful detecting revenue and bad debt manipulation, whereas the margin model is better detecting expenses manipulation.

Kothari et al. (2005):

This paper examines the specification and power of the Jones and modified-Jones models. The paper includes an additional variable to the Jones and the modified Jones models to control for the effect of the firms performance on discretionary accruals.

Performance matching is based on the return on assets (ROA) in period (t) to control for the effect of performance on measured discretionary accruals. The model also includes a constant to add further control for heteroskedasticity, and according to the results, it mitigates problems stemming from an omitted scale variable and it makes the discretionary measures more symmetric.

Therefore, the model is as follows:

$$\frac{TA_{it}}{A_{t-1}} = \delta_0 + \delta_1(\frac{1}{A_{t-1}}) + \delta_2(\frac{\Delta SALES_{it}}{A_{t-1}}) + \delta_3(\frac{PPE_{it}}{A_{t-1}}) + \delta_4(\frac{ROA_{it}}{A_{t-1}}) + \nu_{it}$$

ROA in period (t-1) can be used also. The process is similar to the Jones model, where the residuals represent the discretionary accruals. Comparing this model to the Jones and modified Jones models shows that the model of this study has higher power.

Geiger and North (2006):

The paper examines the level of earnings management surrounding the appointment of a new CFO. The study is based on the involvement of CFOs and their influence in the financial reporting process. Therefore, the change in CFO personnel could lead to different financial results even if the business environment remains the same.

Geiger & North (2006) estimates the normal level of accruals using the Jones model on cross-sectional data available from all firms except the sample firms. The estimated coefficients from the industry regression are then used to estimate the predicted accruals for the sample. The discretionary accruals are computed as the difference between the normal accruals and predicted accruals.

Results indicate that discretionary accruals decreases significantly in firms after appointing a new CFO compared to non- hiring firms. This result is supported furthermore by finding a higher level of discretionary accruals in the year prior to the new CFO appointment. Additionally, to provide further evidence that the reduction in discretionary accruals is mainly caused by the appointment of a new CFO, the paper runs a multivariate test to control for factors associated with level of discretionary accruals. Another interesting result is the variation in discretionary accruals for firms appointing CFOs from within the firm and hiring them from outside the firm; significant

reduction in discretionary accruals are found in firms hiring an external CFO, similar results are obtained in firms hiring from their own external CPA.

The study would have been even more beneficial if it observed the level of discretionary accruals after the appointment of the new CFO (e.g. in year t + 3); such evidence could assist to determine the time period discretionary accruals start to increase again, back to the level they were in the year prior to the change in CFO personnel.

Charitou (2007):

The paper examines earnings management behaviour in distressed firms; it focuses on examining whether bankruptcy-filing firms are more conservative in their financial reporting compared to non-bankrupt firms one year prior to bankruptcy-filing, taking into consideration the qualified audit opinion.

Charitou (2007) differentiates between short-term and long-term accruals since managers have more control over the short-term accruals. The accruals are estimated using a cross-sectional Jones model as modified by Teoh et al. (1998a). The results indicate that managers of distress firms manage earnings downwards one year prior to the bankruptcy filing. Firms with large negative long term accruals one year prior to bankruptcy filing have a greater chance to survive. Moreover, the results show firms receiving unqualified audit opinions in all 5 years prior to the bankruptcy-filling event, manage earnings upwards in those same years and more (negative) earnings management is associated with more negative subsequent returns in the following years.

Daniel et al. (2008):

The paper tests the upward managed earnings in dividend paying firms. Based on evidence from previous literature, the paper argues that managers will do almost anything (e.g. laying off employees, selling assets, ext.) to avoid dividends cuts. This is considered as first-order priority, and hence an incentive for managers because dividends are of high importance to investors. Therefore, the study is based on managing earnings to meet dividend thresholds, taking into consideration the existence of debt covenants, since these agreements place restrictions on reported income which in turn is an important determinant of dividends.

The main hypothesis tested is managers will manage earnings upward to avoid dividend cuts when reported earnings fall below the expected dividend levels. To test this, the pre-managed earnings are observed to see whether it falls below the expected dividend payments. The pre-managed earnings are calculated as operating cash flow plus non-discretionary accruals minus preferred dividends.

Both nondiscretionary and discretionary accruals are estimated using a cross-sectional version of the Jones model. In order to detect earnings management, discretionary accruals are compared with the dividend threshold. After which, a variable is used which equals the maximum of zero or earnings shortfall (earnings short fall is expected dividends minus pre-managed earnings). This variable is labelled *Deficit*.

The results show that firms are managing earnings upward to meet dividend thresholds, especially in firms where pre-managed earnings are below expected dividend levels. The results also show firms with less outstanding debt have less aggressive earnings management, confirming a relation between debt covenants and dividend thresholds. The study also finds less earnings management in other firms with different settings (e.g. after the passing of Sarbanes-Oxley act of 2003, high payout ratio, higher dividends for CEO, high pay-performance sensitivities) all these represent restraints on managers' ability to manipulate earnings. The interesting part of this study is observing the pre-managed earnings; same method followed DeFond & Park (1997)[1]. This method is very helpful to observe reported earnings and its effects before and after manipulation.

Caramanis and Lennox (2008):

The paper examines the effect of audit effort on earnings management. The audit hours are used as a measure for audit effort. The main argument is the more audit hours are spent on a client the less earnings management, or earnings overestimation, is detected in that client. Discretionary accruals are estimated using the Jones model. The results show that discretionary accruals are positive when audit hours are lower. Additionally, the magnitude of income increasing abnormal accruals is greater when audit hours are lower. The earnings distribution is also examined to detect any discontinuity around

[1] DeFond and Park (1997) study is not examined in this literature review since it is related more to income smoothing rather than accrual manipulation.

zero. This study combines the abnormal accruals with a benchmark to test whether or not the company just meets or beats the zero benchmark.

Results using this approach are consistent with the abnormal accruals approach, and show that low audit hours are associated with companies managing earnings upwards to avoid reporting losses. It should be noted that the results show a weak association between audit hours and income decreasing earnings management. This result is consistent with findings of past studies that auditors are more likely to detect overstated earnings.

2.2.2 Studies using the distribution approach:

The second approach in the earnings management literature is the earnings distribution approach, and has lately becoming a preferred method for some authors. The basic idea in this approach is simple, the earnings are distributed and their frequencies are observed, if the distribution is symmetrical then there is no earnings management, but if a discontinuity is evident around zero or a certain benchmark, then that's a sign of earnings management. But the distribution of earnings alone is not sufficient; there must be certain thresholds to look for, and locating the discontinuity at these thresholds.

Burgstahler and Dichev (1997):

This paper is the most study cited for authors using this approach. The study begins initially by identifying certain thresholds that would stimulate incentives for managers to manipulate. The paper, and based on anecdotal evidence, suggests that there are strong incentives to avoid reporting earnings decreases and to maintain positive earnings and avoiding losses. To detect earnings management to avoid earnings decreases, the paper examines cross-sectional distributions of earnings changes to find whether there are normal low frequencies of small earnings decreases and abnormal high frequencies of small earnings increases. Furthermore, avoiding losses will be reflected in the form of abnormal low frequencies of small losses and abnormal high frequencies of small positive earnings. Under the null hypothesis of no earnings management, the standardized differences in earnings will be approximately normally distributed.

Burgstahler & Dichev (1997) argues that incentives to avoid earnings decreases become stronger with the length of the previous run of earnings increases. These stronger incentives lead to more pronounced effects of earnings management in the intervals close to zero. An important issue the paper acknowledges is that not all firms have the same opportunity to manipulate. Firms that face lower *ex ante* costs of earnings management are more likely to be the manipulators. Likewise, firms with high levels of current assets and current liabilities find it less costly to manipulate. The study documents this by finding the firms with lower levels of current assets and current liabilities in the intervals immediately to the left of zero and higher frequencies of firms to the right of zero.

Results show that 8%-12% of firms with small pre-managed earning decreases exercise discretion to report earnings increases, and 30%-44% of firms with slightly negative pre-managed earnings exercise discretion to report positive earnings. Moreover, the paper finds that cash flows from operations and changes in working capital are the main tools to manage earnings

Degeorge et al. (1999):

The paper identifies three thresholds that are the most likely drivers for earnings management. Executives have both the incentive and ability to manage earnings as a response to implicit and explicit rewards for attaining specific levels of earnings. The study introduces a model that predicts how executives strategically manage earnings reported to external users, after which the study examines historical data to confirm such pattern. This model incorporates behavioural propensities and a stylized description of the interactions among executives, investors, directors and analysts in order to identify earnings manipulation patterns. However, the study did not include the component(s) of earnings or of supplementary disclosure that are adjusted, nor did it distinguish between direct earnings management and misreporting.

The main three thresholds identified are: firstly to report profits, which arises from a psychologically importance of distinction between positive and negative numbers. The second and third thresholds rely on performance perspective, and it is to outdo last year performance and meeting analysts' expectations. The study assumes that when earnings are near unacceptable range, the incentives to manage upwards will be significant.

Moreover, if earnings exceed limits of bonus plans they will be shifted forward making future limits easily achieved (saving for a better tomorrow). The thresholds are important for managers since concerned parties with the firm consider them important as well. The study also argues that managers will still manipulate even if the thresholds do not matter anymore, the most probable incentive will be personal satisfaction (e.g. achieving targets managers set for themselves). The cases in which the study looked for earnings manipulations are based on these thresholds. In the case where earnings fall just short of thresholds, earnings will be managed upward, whereas when earnings are far from thresholds (whether below or above) earnings will be reined, making thresholds more attainable in the future. Discontinuities in the earnings distribution are observed to indicate the threshold-based earnings management.

Conditional distributions reveal that thresholds are hierarchically ordered; most importantly making profits, secondly reporting quarterly profits at least equal to profits reported four quarters ago and thirdly to meet analyst's expectations. The results also show that outsiders and insiders alike use psychological bright lines such as zero, past earnings and analysts' projected earnings as meaningful thresholds for assessing firm's performance.

Beatty et al. (2002):

This paper examines the stream of earnings changes and the components of these changes for publicly vs. privately held banks. The focus on public vs. private is because shareholders of public banks are more likely than those of private banks to rely on simple earnings-based heuristics. The interesting feature of this study is the ability to observe and examine earnings management in public held companies as well as in private held companies. Furthermore, this study provides basis for comparison of earnings management in financial and non-financial firms using Burgstahler & Dichev (1997) approach.

The results show that public banks report more small-increases and fewer small-decreases in earnings than expected, but there is only weak evidence that private banks report fewer small decreases in earnings than expected. Similarly, the study shows that public banks report more small decreases and fewer small declines in earnings than private banks, even after controlling for differences in the operations, bank size, asset

growth, cash flows loan characteristics, and geographic region between public and private banks. The study also shows that public banks use loan loss provisions and realized security gains & losses for upward manipulation. The results also confirm that public banks enjoy longer strings of consecutive earnings increases than private banks because they will manage earnings to avoid reporting small decreases in earnings.

Dechow et al. (2003):

The paper examines whether small profit firms have high discretionary accruals relative to all other firms and small loss firms. The paper examines the discretionary accruals of firms' laying on the right of zero to those laying on the left. Discretionary accruals are estimated using the modified Jones model.

The results do not support earnings management hypothesis, where the small profit and small loss firms have similar levels of discretionary accruals and both groups have similar proportions of positive discretionary accruals firms, and the discontinuity does not disappear nor decline in the distribution of firms with only income decreasing discretionary accruals. However, the paper attributes these results to the probability of low power in the model or the boosting of discretionary accruals does not explain the "kink" in the earnings distribution. The paper also provides alternative explanations to the presence of the kink in distributions without testing them; one explanation is managers are taking real actions to ensure that they report a profit rather than a loss.

Durtschi and Easton (2005):

The paper questions the approach of discontinuity around zero and the resulting shapes that researchers rely on as evidence of earnings management, and provide evidence that the shapes of the frequency distribution of earnings are affected by either: deflation, sample selection criteria, characteristically differences in firms, or a combination of these effects. The paper shows evidence of no discontinuity around zero for the frequency distributions of net income, basic EPS and diluted EPS, which led the authors to cast serious doubt on the conclusions from previous studies. The study provides evidence that deflation of net income distorts its underlying distribution. Therefore, deflation might be causing the discontinuity around zero. Results also show that the proportions of observations with small losses that are deleted because of the

unavailability of the beginning of year prices on the *Compustat* files is greater than the proportion of observations with small profits that are deleted for the same reason.

Durtschi & Easton (2005) questions the results obtained by Degeorge et al. (1999) as well by providing evidence that discontinuity may reflect a tendency for analysts to avoid coverage of firms with small losses, rather than being evidence of earnings management to meet analysts' expectations. They also find that analysts' forecast errors tend to be much greater when they are optimistic than when they are pessimistic. Hence, positive errors will tend to cluster around zero, while negative errors spread away from zero leading to a frequency distribution suggesting earnings management. The paper concludes by stating that these explanations, as well as others, must be ruled out for researchers to claim that the shapes of these distributions around zero are evidence of earnings management. This paper raises serious questions about the validity of the distribution approach and the results obtained by it.

Leuz et al. (2003):

The study provides comparative evidence on corporate earnings management across 31 countries. It starts with a descriptive country analysis, where countries are grouped based on similar legal and institutional characteristics; outsider economies (US & UK), insider economies (e.g. Germany) and insider economies with weak legal enforcement (e.g. Italy and India).

The results show that outsider economies display the lowest level of earnings management and the insider economies with weak enforcement the highest level of earnings management. Two proxies are used for earnings management; earnings smoothing and accrual manipulations. The study runs a multiple regression analysis to examine the relation in earnings management difference with private control benefits and investor protection. Regression results show that earnings management is negatively related to outsider rights and legal enforcement; the results also show that earnings management is positively associated with the level of private controls benefits enjoyed by insiders.

Jacob and Jorgensen (2007):

The paper re-examines Burgstahler and Dichev (1997) study using a research design, which allows firms in aggregate, to serve as their own control. The results did validate the findings of Burgstahler and Dichev (1997). Furthermore, the findings are not spuriously induced by scaling. The paper is designed based on histograms of earnings measured over alternative annual periods to investigate discontinuities in fiscal year earnings. The paper argues that incentives to manage earnings are strongest in the fourth quarter of the fiscal year, because managers at this time are likely to have a good sense about where they stand with regard to annual targets. The paper also finds evidence of discontinuity at the zero benchmark in un-scaled net income and EPS, which differs from those found in Durtschi & Easton (2005).

Kerstien and Rai (2007):

This paper examines the change in the cumulative earnings distribution from the beginning to the end of the firm's fourth fiscal year. The paper goes beyond examining earnings distributions by examining earnings changes distribution as well. This approach differs from the one used by Jacob & Jorgensen (2007), by focusing on year-to-date rather than concentrating on aggregate measures over a moving window of four consecutive quarters.

Kerstien & Rai (2007) selects a group of firms that are close to the zero-profit line of the cumulative earnings distribution (treatment group), and a control group that consists of firms next to the treatment group. This group will have similar probability of shifting a given length and direction during the fourth quarter. By implementing logistic regressions, results show that firms with the smallest cumulative losses after three quarters report the smallest annual profits at an abnormally higher rate than the control firms. Moreover, firms with the smallest cumulative profits report the smallest annual profits at an abnormally high rate to avoid annual losses. To put it in different words, the kink in the earnings distribution becomes more visible during the fourth quarter, since managers at this point can estimate more accurately the amount of manipulation needed to achieve specific targets.

Roychowdhury (2006):

The paper provides a closer look on how manipulation takes place and clarifying the importance of the zero benchmark, differentiated between accrual manipulation and real activities manipulation. The paper presents evidence on the management of operational activities. The author defines real activities manipulation as "management actions that deviate from normal business practices, undertaken with the primary objective of meeting certain earnings thresholds".

Roychowdhury (2006) measures cash flow from operations, production costs, and discretionary expenses to capture the effect of real operations because they detect the real activities manipulation better than accruals manipulation around the zero benchmark. The results are consistent with earnings management to avoid losses, either by offering price discounts to temporarily increase sales, or lowering cost of goods sold by engaging in overproduction or reducing discretionary expenses to improve margins, or by doing all three together. These results are strong evidence of how managers use available accounting technology to manage earnings.

Previous studies are more concentrated on the detection process and give little attention of how the manipulation takes place; this by itself is considered the major contribution of this paper. The results also show that the presence of sophisticated shareholders restrict the managers ability to manipulate earnings upward, and the presence of debt, stock, debtors and growth opportunities are positively associated with real activities manipulations. The results of this paper, not only provide an in-depth understanding of the importance of the zero benchmark, but also provide a basis for the connection between the desire and the ability to manipulate.

Leone and Van Horn (2005):

The paper examines the incentives to manage earnings in not-for-profit hospitals; some of the incentives include credit evaluation, managerial assessment and donation decisions. The study did detect earnings management in these not-for profit-firms, but for different aims. The study argues that hospital manager's place high importance on the earnings figure since they are evaluated based on it; also donors consider hospitals profitability when making donation decisions.

Discretionary accruals are estimated using the Jones model but after modifying it for the special accrual accounts used in not-for-profit hospitals. After which, the discretionary accruals are used in the distribution approach to examine the discontinuity around the zero benchmark. The study examines two major accounts that are material and require substantial judgment to determine proper balances. The first account is third party settlements (e.g. managed care organisations); the second account is allowance for doubtful accounts. After which, the pre-managed earnings are distributed and compared with operating profit to detect any discontinuity around the zero benchmark.

Results indicate that hospital managers are manipulating earnings towards zero as well as manipulating earnings to avoid losses, but the study did not find evidence of avoiding negative earnings changes. The paper attributes this to the absence of equity markets, unlike for-profit firms that are motivated to avoid reporting earnings decreases. The implications of this study are many; one is documenting earnings management behaviour in different firm-settings that have different incentives, goals and objectives, another is specifying the special accrual accounts that each industry has and can use to manipulate reported income. Almost all studies examines and detects earnings management in corporate firms, that are publicly held, and their reported earnings echoes in the equity market, but there are other types of incentives that do not relate to financial markets that motivate managers to manipulate their earnings, as this study shows.

To summarise the distribution approach, earnings manipulation is a result of general incentives. This approach assumes in the absence of no manipulation earnings the distribution will appear symmetrical (i.e. smooth), but manipulated earnings will show a discontinuity around zero. The zero point represents a general threshold (e.g. report a profit) mangers want to beat, or at the very minimum meet.

The interesting thing about this method is not only it provides a detection method, but sets up general benchmarks for manipulation. This method assumes implicitly that earnings management happens all the time (e.g. reporting a positive number rather than a negative number). Other studies examine a specific event where the presence of earnings management is expected, and when that event is expired there will be no more earnings management. However, the problem with this technique is no one knows how the unmanaged earnings distribution would actually appear. One way to find out is

observing the distribution of earnings (E_t) after subtracting the managed accruals (DA) from it (Gore et al., 2007) that is, the distribution of ($\Delta E_t - DA_t$) will appear smoother than earnings distribution including the discretionary accruals. This approach shows firms that are just above the threshold with (E_t) appear below the threshold with ($E_t - DA_t$). Other researchers (for example, Daniel et al., 2008) observed the distribution of earnings before manipulation as compared to the distribution of earnings after manipulation; they compute the pre-managed earnings as cash flow from operations plus nondiscretionary accruals (nondiscretionary accruals are obtained from the Jones model).

2.2.3 Studies which specify the managed accrual(s) component:

A third approach used in literature is the single accrual approach, but gained little attention from researchers in earnings management studies. Some of the researchers however, do specify the exact accrual(s) that is used to manipulate, but as a second step after applying the accrual approach or the earnings distribution approach.

McNichols and Wilson (1988):

This is the first study to use a single accrual approach; it considers the provision for bad debts, rather than a collection of accruals. The paper distinguishes the discretionary portion from the non-discretionary portion of this single accrual using generally accepted accounting principles (GAAP) related to this account. However, the paper does acknowledge that this account is one of many other accounts that are used to manipulate reported earnings.

McNichols & Wilson (1988) tests two hypotheses, the first one relates to income smoothing, where firms reporting unusually high earnings will choose income decreasing accruals and firms reporting unusually low earnings will choose income increasing accruals to minimize the variance in reported earnings. The paper set benchmarks to specify the unusually high or low earnings, and considers four benchmarks, namely, zero, industry average ROA, return on the firm's average ROA, and ROA in the previous year, for each firm. The other hypothesis tested is that managers whose compensation plans have lower bounds have an incentive to maximise (minimise) discretionary expense (revenue) when the plans are out of money. The paper

does however emphasis that it does not replicate nor re-test Healy's (1985) result but rather it is testing a more general hypotheses motivated by that work.

The McNichols & Wilson (1988) model is based on the provision of bad debts. It decomposes the provision into an unmanaged component, which is set under the GAAP guidelines; and a managed component, which estimated by managers. Under the null hypothesis of no earnings management, the provision adheres only to GAAP guidelines. The provision depends on the allowance's beginning balance, the current period's write offs, and management's expectation of future write-offs. But since the latter is difficult to measure, the model incorporates the future write offs as a proxy for management's expectation (i.e. write offs at t + 1), therefore the model is:

$$\text{Prov}_t = \alpha_0 + \alpha_1 \text{ BgBl}_t + \alpha_2 \text{ Write-off}_t + \alpha_3 \text{ Write-off}_{t+1} + \textit{resprov}_t$$

Where:

$Prov_t$: the provision for bad debts, deflated by period t sales

$BgBl_t$: the beginning balance of allowance for bad debts in period t, deflated by period t sales.

$Write\text{-}off_t$: write-offs for period t, deflated by period t sales.

$Write\text{-}off_{t+1}$: write-offs for period t +1, deflated by period t sales.

$resprov_t$: the projection error, which by design is orthogonal to the regressors.

The projection error or residual ($resprov_t$) contains two components: the discretionary part of the provision or the manipulated part and the future write-offs forecast error, and both parts are orthogonal to the regressors. When the projection errors are aggregated to test for earnings management, the write-offs forecast error component is assumed to average to zero. Thus, the underlying intuition of this model is since outsiders cannot separate the forecast error from the discretionary component, they cannot detect earnings management.

Results support the earnings management hypothesis; firms manage their earnings by choosing income-decreasing accruals when income is extreme. The paper also

introduces a proxy for discretionary accruals that can be more powerful and less bias than proxies used in studies prior to this one.

Kang and Sivaramakrishnan (1995):

The paper build a model based on more than one accrual account to capture a larger portion of managed accruals. The model is based on the assumption that each accrual account contains two components; unmanaged and managed parts. Based on that, sales revenue is expressed as:

$$REV_t = REV^*_t + DA^s_t$$

Where REV_t is reported sales revenue, REV^*_t is the unmanaged sales revenue in period t, and DA^s_t is the managed accrual added to sales, therefore the reported debtors will be overstated by DA^s_t at the end of the period:

$$AR_t = AR^*_t + DA^s_t$$

Similarly, other accruals are decomposed into unmanaged and managed components, therefore all accruals are:

$$AB_t = (AR^*_t + INV^*_t + OCA^*_t - CL^*_t - DEP^*_t) + (DA^s_t + DA^e_t + DA^d_t)$$

$$= AB^*_t + DA_t$$

Where AB^*_t is the unmanaged accruals balances, INV^*_t, OCA^*_t and CL^*_t, denote unmanaged: stock, prepaid expenses and payables, respectively; DA_t is the total managed accruals in period t; DA^e_t is the managed expenses; and DEP^*_t and DA^d_t is the unmanaged deprecation expenses and the managed portion of it, respectively.

The model, therefore, and by using instrumental variables, is as the following:

$$AB_t = \phi_0 + \phi_1 [\delta_1 REV^*_t] + \phi_2 [\delta_2 EXP^*_t] + \phi_3 [\delta_3 GPPE^*_t] + \beta\, PART_t + \nu_t$$

Where:

$\delta_1 = AR^*_{t-1} / REV^*_{t-1}$; $\delta_2 = APB^*_{t-1} / EXP^*_{t-1}$; $\delta_3 = DEP^*_{t-1} / GPPE^*_{t-1}$; and APB^*_{t-1} is sum account balances related to expenses ($INV^*_t + OCA^*_t - CL^*_t$), GPPE is the gross property, plant and equipment. The error term will be correlated with the regressors if

earnings are managed. This model is similar in spirit to the Jones model, but differs by including cost of goods sold and other expenses, also it uses account balances rather than changes in these balances and because using instrumental variables, it does not require the regressors to be uncontaminated. All variables are deflated by total assets in period t-1 for stationary purposes.

Petroni (1992):

The paper examines managers' discretion of property-casualty insurers and its effects on claim loss reserves. The study also examines directly managerial incentives to manipulate claim loss reserve estimates. Results indicate that managers of financially weak insurers manipulate their claim loss reserve downwards, relative to financially strong insurers.

Beaver and Engel (1996):

The paper examines the effects of management choice on the allowance for loan losses in the banking sector. The focus is to determine whether the capital market assigns different prices to the discretionary and non-discretionary components of the allowance for loan losses.

The results show that the market assigns different prices to each component; while the nondiscretionary component is priced negatively, the discretionary component has a positive incremental pricing coefficient. Moreover, the study finds that if the market fails to decompose the accrual account then the incremental pricing coefficient becomes zero.

Beneish (1997):

The paper examines more than one accrual account that managers can use for manipulation. The paper examines actual instances of earnings management and presents a model to detect it among firms with extreme financial performance and compares the model's performance to that of accrual model. The model is based on variables intended to capture incentives that would motivate firms to violate GAAP, the likelihood of detection, and distortions in financial data caused by violation of GAAP.

The model presented in the paper provides a probability estimate of the likelihood of earnings management among firms for which abnormal accruals are misspecified. The paper uses a sample that contains two groups; GAAP violators and "aggressive *accruers"*. The model includes variables which proxy for motivations to manage earnings.

The interesting point Beneish (1997) makes is that current models estimate discretionary accruals with considerable imprecision and that some accrual models randomly decompose earnings into discretionary and nondiscretionary components. Therefore, the paper models the incentives that could lead to earnings management by using the available accruals rather than modelling discretionary accruals.

Beaver and McNichols (1998):

This paper examines the characteristics and valuation of one accrual account, namely, the reserve for claim losses in property casualty insurance companies. Managerial discretion rises from the substantial judgment required to estimate the loss reserve. The model used in this study accounts for serial correlation in errors.

The results show that there is substantial serial correlation in loss reserve development, which is an indication that reported loss reserves do not fully reflect available information, which is also consistent with management exercising discretion over reported loss reserves.

To summarize, and going through the literature of earnings management reveals a number of competing models and approaches to detect such behaviour, all models are of low power, and none of them is superior to another (Dechow et al., 1995).

The Jones model (Jones, 1991) is used by most researchers, because it decomposes total accruals into nondiscretionary and discretionary, but some researchers criticise this model because it does not take into consideration growth firms. In other words, the Jones model will detect earnings manipulation when in fact there is none, because growing firms are usually characterised with high accruals (Kothari et al., 2005). Another problem with this model is the need for long time series observations to estimate the coefficients accurately, and such availability of accounting data is not always available. Additionally, one must assume that there is no earnings management

in the estimation period. Therefore, a cross sectional version of the Jones model is used intensively in literature. An important issue when applying this model on cross sectional data is the assumption that some firms are manipulating upwards while some firms are manipulating downwards, so on average there is no earnings management. The switch to the cross sectional methodology did not solve all the problems with the Jones model itself, it just made it convenient for researchers (e.g. increasing sample size), but maintaining the same assumptions of the model. The residuals will average to zero regardless the approach or method used to estimate the coefficients.

The Jones model gains its popularity from its ability to decompose accruals into discretionary and nondiscretionary components. Studies before investigate the change in total accruals without a clear cut examination of its discretionary and nondiscretionary components. For example, Healy (1985) and DeAngelo (1986) examine the total accruals changes between the estimation period and the event period, without decomposing the total accruals. In addition, both models assume stability in the economic condition of the companies, whereas the Jones model takes into consideration the economic changes and growth. Therefore, the Healy model and the DeAngelo model are very good models in non growth environments, but since the economic conditions of companies is always changing the Jones model is better. But the low power of the Jones model is still a concerning issue for many researchers.

To improve the model in terms of its power, a number of following studies proposed a modification to the Jones model (Dechow et al., 1995; Teoh et al., 1998a; Kothari et al., 2005) but the power of the modified models is still low although higher than the original model.

An important factor that must be considered by researchers is that the Jones model has only one objective and that is to detect earnings management without specifying the accounts (i.e. accounting tools) managers used. To state it differently, the Jones model only tells us that there is manipulation but it will provide nothing useful for regulators and standard setters on how exactly it is achieved, since they are the ones only to view earnings management as problematic. Academics on the other hand do not consider it as a serious issue because they believe that not all firms are manipulating and if some firms are actually manipulating, it should not concern investors (Dechow & Skinner, 2000).

Another concerning matter in the Jones model is using the residuals to measure the discretionary accruals. While in time-series setting, it is considered reasonable to use the residuals, to measure the difference between normal and abnormal accruals in the estimation period and the event period, respectively. However, in cross-sectional settings it is not the same. The residuals, by theory, should average to zero. Therefore, the specification of the model is seriously questioned when it comes to the measurement of discretionary accruals. Anecdotal evidence tells us that firms in the same industry will share similar incentives. In other words, all firms will have the same incentive to manipulate in the same direction (i.e. herding reaction), and as a result, the residuals will not capture the manipulation because they will average to zero.

The earnings distribution approach shows earnings after the manipulation have occurred, but it does not specify what instruments managers used. Nevertheless, it is still beneficial in specifying the benchmarks (incentives) that managers are trying to meet. A close look at this approach will reveal that earnings management is happening all the time and by most firms. The zero benchmark will still be an important incentive, at least from a psychological point of view; managers are very keen to report positive numbers rather than negative earnings, or as Degeorge et al. (1999, pp 6) states it: "there is something fundamental about positive and non-positive numbers in human thought processes". There will always be an incentive or benchmark that drives earnings management, and to assume that earnings management must not concern investors is a naïve assumption. Manipulation distorts financial statements and damages their information sources reliability and relevancy characteristics, and could lead to an imprecise decision made by investors.

At this point in earnings management research, the important issue any researcher must look into is how managers are using the accrual accounts to achieve their targets. Enough research has been done on the many incentives and motives behind the manipulation. In fact and loosely speaking, the reliance on incentives is the first thing to identify in order to narrow down the search or detection of earnings manipulation. The next step in this area is specifying exactly the accrual accounts that are used and the magnitude of manipulation that took place. Therefore, one must include specific accruals in the model (Healy and Wahlen, 1999; McNichols, 2000).

Another important issue is examining the barriers that limits or restrains managers' ability to manipulate. This is a very important issue that most researchers overlook or do not take it into consideration when modelling earnings management. But limitations of earnings management are of high importance for standard setters and regulators and can be used as basis to eliminate or at least reduce managers' ability to manage their reported earnings. The Auditor, as a restriction factor, is considered in some papers to prevent or limit managers ability to manipulate, but that alone is not enough and not necessarily always true (for example, see Arthur Anderson case with Enron).

In a hypothetical situation, if firms can report their financial statements un-audited and by only complying with GAAP standards and there is no restrictions on managers by any regularity bodies. Additionally in this situation, the incentive is to increase reported income as a response to a certain event. The question is, which accrual account (tools) managers might use to seize this opportunity while simultaneously misleading investors? Therefore, the issue of earnings management must be studied and examined from an accounting point of view. This is achieved by using our accounting experience and familiarity with an industry in order to look for the potential accruals that can be used to manipulate earnings (Fields et al., 2001). For example, debtors, stock and creditors are good first places to examine as potential accrual tools used in earnings manipulation.

2.3 Model development:

There are a various models and approaches to detect earnings management. The most used approach is estimating discretionary accruals, especially using the Jones model. The Jones model aims at controlling for the normal level of accruals that are affected by the changes in the firm's economic condition, and anything that cannot be explained is considered abnormal. The model captures this abnormality in accruals using the residual term (error) from the model. Basically, Jones (1991) estimates total accruals for the event period using the *estimated* coefficients from the estimation period. After which, the paper compares the estimated total accruals with the calculated total accruals from the event period, and any resulting difference is attributed to managers' discretion.

Two problems relate to this model when applying it on time-series data. The first is the assumption of no earnings management in the estimation period and the residuals are randomly scattered (McNichols, 2000). During the estimation period the coefficients for the nondiscretionary accruals variables are assumed to capture normal levels of accruals, and the residual term represents only white noise. The above assumption indicates that companies with no motivation to manipulate in previous years will not manipulate in years following the event period. Jones (1991) included in sample only the companies that are assumed to manipulate downwards in the event period, but the model itself does not have a variable that represents an incentive. The second problem is the assumption of coefficient stability during the estimation period. The model does not take into account any macroeconomic factors such as interest rates fluctuations (DeFond & Jiambalvo, 1994; Peasnell et al., 2000)

The residual term, as used exactly in the Jones (1991) study, is a reasonable proxy for discretionary accruals. The residuals in the event period will be zero if there is no earnings management. In other words, the estimated coefficient values from the estimation period when plotted in the event period should give a calculated amount of total accruals that is equal to accruals for the same period in the absence of manipulation. Thus, any differences (in absolute terms) between these two amounts in the event period is considered abnormal that can be mainly explained by managers discretion.

Applying the Jones model on cross-sectional data reduces time effects problems and produces larger samples resulting in a better estimation of the coefficients (DeFond & Jiambalvo, 1994; Subramanyam, 1996). The residual term in this case will average to zero, which is similar to the residual term in the estimation period when applying the Jones model on time-series data. The difference here is the lack of the two periods (estimation period and treatment period) in order to use the residuals to capture the differences and attribute it to discretionary accruals. The residuals in this case are probably capturing other things in the form of noise, in addition to earnings management. Moreover, the residuals from a statistical perspective, should average to zero. As a result, an additional variable must be included in the Jones model to capture discretionary accruals in cross-sectional settings. Hence, the underlying assumption of the cross-sectional version of the Jones model is that some firms are manipulating downwards and some firms are manipulating upwards and on average they sum to zero. This problem arises because the change in revenue and fixed assets are not controlling for all the nondiscretionary accruals, i.e. it's not the perfect model and not the best fit, and as mentioned above, the residuals will be capturing earnings management in addition to the noise introduced by the lack of fit.

The modifications on the Jones model by previous studies (Dechow et al., 1995; Teoh et al., 1998; Kothari et al., 2005) aims to increase its power, but not at this particular issue. Applying the model on cross sectional data is designed to deal with the problem of unavailable long time-series observations. But the assumption is even more transparent in cross sectional settings; the residuals will average to zero.

The distribution approach (Burgstahler & Dichev, 1997; Degeorge et al., 1999) has an advantage of being relatively simpler to apply, and it is a graphical description of the earnings after the manipulation takes place. However, this approach gains its popularity from the benchmarks it sets as incentives for earnings management. A zero benchmark is an incentive managers want to meet and avoid reporting a loss. This is the most basic incentive that explains manipulation. The problem with this approach is its inability to differentiate between accruals manipulation and change in accounting choices, and it does not capture the magnitude and specific methods (instruments) to manage earnings (Healy &Wahlen, 1999). Therefore, it is beneficial only for descriptive purposes by

setting the benchmark, which represents the incentive and showing the discontinuity or "kink" around that benchmark as evidence of earnings management.

To move ahead in earnings management literature, new methodologies must be employed rather than using the same methodology just because others have implemented it (Fields et al., 2001).

The single accrual approach is not well covered in earnings management literature (McNichols, 2000; Healy et al., 1999) although the approach is first used around the same time as the publication of the Jones model came out (e.g. McNichols & Wilson, 1988), but did not attract much attention from researchers. This approach relies on specifying one or more accrual accounts and decomposing them into managed and unmanaged components, a process that is not easy. The main reason this approach did not get enough popularity is the tests used to detect single accrual manipulation, but the underlying concept is still attractive and more beneficial than other approaches, because if tested properly it gives a useful insight on how exactly manipulation took place, rather than just speculating on how it was done. The process used to decompose each accrual account is similar to the total accrual approach used by Healy (1985) and DeAngelo (1986) but on the account level rather than total accruals level.

The above discussion does not imply that the Jones model should not be used; it is still well specified when it comes to the nondiscretionary accruals (Dechow et al., 1995; Peasnell et al., 2000; Kothari et al., 2005) but it still requires an additional variable(s) to control for the discretionary accruals rather than using the residual term. In this manner, the model will include variables that will control for both nondiscretionary and discretionary accruals, and having a residual term that represents only white noise.

In this research, the Jones model is applied but with including an additional variable that controls for the discretionary accruals. The model controls for the nondiscretionary accruals using change in sales revenue and fixed assets; discretionary accruals are controlled by change in accrual accounts. The proposed model is as following:

$$\frac{TA_i}{A_{t-1}} = \alpha \frac{1}{A_{t-1}} + \beta \frac{\Delta REV_i}{A_{t-1}} + \gamma \frac{PPE_i}{A_{t-1}} + \lambda \frac{\sum_{j=1}^{N} ACC_{ij}}{A_{t-1}} + \varepsilon_i$$

Where ACC_i is the change in accruals accounts and j= number of accruals manipulated to manage earnings.

The model is the Jones model but with an additional variable to control for discretionary accruals. The main difference between the two models is that in the Jones model earnings management is captured by the residuals, while in the proposed model here, earnings management is captured by a specific accrual, and having the residuals representing the error term or simply the noise.

The hypothesis of this research is that change in revenue and fixed assets will explain the normal level of accruals, but the change in the accrual account will explain the extra amount in total accruals that is not explained by the nondiscretionary accruals. All variables are lagged by total assets in period t-1 to reduce heteroskedasticity.

The model proposed here is not sufficient by itself; it still requires an additional variable that represents an incentive. Including such variable will focus this research on the firms that share the same incentive and will manage their earnings in the same direction to meet a specific benchmark; other firms that do not share the same incentive will not manage their earnings.

Therefore the proposed model becomes:

$$\frac{TA_i}{A_{t-1}} = \alpha \frac{1}{A_{t-1}} + \beta \frac{\Delta REV_i}{A_{t-1}} + \gamma \frac{PPE_i}{A_{t-1}} + \lambda \frac{\mathrm{D}` * \sum_{j=1}^{N} ACC_{ij}}{A_{t-1}} + \varepsilon_i$$

where D is a dummy variable that equals 1 if the incentive applies and 0 otherwise.

This model is a combination of the three approaches used in literature; it uses the total accruals method by using the Jones model (Jones, 1991) to control for changes in total accruals by decomposing accruals into nondiscretionary and discretionary; it uses a single accrual account (McNichols & Wilson 1988) which represents the discretionary component, and it includes a benchmark (Burgstahler & Dichev, 1997; Degeorge et al., 1999) which represents the incentive. In other words, the model explicitly incorporates an incentive and a specific accrual account to show that firms sharing the same incentive will manipulate in the same direction using the same accrual.

The model is applied on cross sectional data; thereby there is no need for long time series observations, and by not using the residual term as a proxy for discretionary accruals, there is no assumption that some firms are manipulating upwards and some firms are manipulating downwards. This is the core difference from the standard Jones model, where discretionary accruals are measured by the residual term, but in the proposed model here, discretionary accruals are measured by the product of the dummy variable and accrual account (D*ΣACC).

Dechow et al. (1995) proposed a modification to the Jones model by subtracting change in debtors from change in sales in the event period. This modification to model is based on the assumption that all credits sales in the event period result from earnings management. When applying the modified Jones cross sectionally, the assumption becomes that all credit sales result from earnings management, which seems as a heroic assumption. However, the model in this research assumes that a portion of credits sales result from earnings management for companies that have the similar incentive, but not all credit sales. The change in sales revenues included in the model controls for the normal levels of both cash and credit sales. The abnormal level of credit sales (i.e. change in debtors) is included in the model for companies that are expected to manipulate.

Some papers argue that the model must include a constant to increase the power of the model and provide additional control for heteroskedasticity (Kothari et al., 2005). However, the theoretical model includes a constant, but when tested empirically the whole model is scaled, including the constant, to reduce heteroskedasticity. Therefore, the model of this research will only contain the *original* constant and when tested empirically it will be scaled with total assets in (t-1). The scaling is assumed to reduce and control for heteroskedasticity, the power of the model is increased by adding an additional regressor to measure the discretionary accruals.

Chapter Three

Tests of accrual management in listed Jordanian companies

3.1 Introduction:

This chapter provides an overview of the Amman Stock Exchange (ASE). Describing the ASE development and past trends since it was established. Moreover, the chapter describes the legal requirements for listing the companies in the market. Particularly, describing the relevant articles of securities law no.76, from which the incentive for managing earnings for listed companies is identified. Additionally, the chapter describes the main market segments and the market index, providing key statistics of ASE.

In this chapter, the extended Jones model developed in the previous chapter is applied on a sample of companies listed in the first market. The main incentive of first market companies is to report profits because if they report losses for three consecutive years they will be delisted from the first market. Results show that companies are manipulating directly after the first loss. The accrual account capturing this manipulation is change in debtors. This suggests that companies are recognising sales early to overstate the sales revenue. Moreover, change in sales in the period following the manipulation year is abnormally low for manipulating companies. This is evidence of accrual reversal. Results show no indication of big bath in the year of losses.

Finally, this chapter provides statistical simulations tests in order to compare the extended Jones model of this research with the standard Jones model. Results show that the cross sectional Jones model only detects manipulation if the artificial manipulation is inserted randomly across a sample of firms. The simulation tests shows that the extended Jones model as modified in this research captures the inserted manipulation in each scenario.

3.2 Institutional Framework:

3.2.1 Amman Stock Exchange: Background and History

In the early thirties, public companies in Jordan were already established and their shares were traded, even before establishing a financial market. Investors subscribed and traded the shares of Arab bank in 1930, which was the first public shareholding company in Jordan. Investors also subscribed in Jordan Tobacco & Cigarettes in 1931, Jordan Electric Power in 1938 and Jordan Cement Factories in 1951.

Shares were traded in non-specialized and non-formal offices. Therefore, the government worked towards setting up a formal market to regulate the issuance and trading of shares to ensure safe and easy trading among investors based on a basic mechanism of defining a fair share price based on supply and demand.

With the government support, various parties started to prepare the basis for a formal organised securities market. Between 1975 and 1976 the Central Bank and with the cooperation of the World Bank's International Finance Corporation (IFC) conducted intensive studies to establish a financial market to cope with the growth of the national economy and increasing numbers of investors in public shareholding companies. As a result, in 1976 the temporary law no. 31 was issued and the Amman Financial Market (AFM) was established. In 1977, following a Cabinet resolution, the AFM administration committee was formed and immediately went into action. Operations and trading in AFM started on the 1st of January 1978.

The temporary law no. 31 of 1976 outlined the main objectives of AFM as the following: encouraging investment in securities, regulating the issuance and trading securities in a manner that would insure the ease, the safety and the speed of transactions and to safe guard the national financial interests as well as the investor's. Other objectives included providing necessary data and statistics of all trading operations carried out within the AFM. Moreover, the market was entrusted with dual roles; the role of Securities and Exchange Commission and the role of a traditional stock exchange.

The market went through major developments due to a comprehensive capital market reforming policy. This policy, which was adopted by the government, aimed at

improving the regulation of the market to meet international standards, it also aimed at expanding and diversifying the national economy. In 1997, the enactment of the temporary law no. 23 came into effect and was indeed a corner stone in the development of the market. This is considered as a qualitative leap and a turning point for the Jordanian capital market. The main objective of the newly established law is to restructure and further regulate the capital market and to complete its infrastructure to be consistent with international standards and securing transparency and safe trading.

The new law is the foundation for three new institutions to replace AFM, namely:

1- Amman Stock Exchange (ASE): established on March 11, 1999, and considered a private sector as a non-profit organisation with legal and financial independence. The exchange is governed by a seven member board of directors, with a chief executive officer that carries out daily responsibilities and reports directly to the board. ASE main responsibility is to run the market. In order to promote transparency, the ASE has two markets, the first market and the second market, in which shares are traded. This system is implemented so that investors can know the status of the company, in terms of profitability and risk, they wish to invest in. Companies that want to be listed in the first market are governed by strict requirements that must be met. These requirements include achieving pre-tax profit for at least two out the three years before being listed; companies must also fulfil the free-float shares requirement and minimum number of shareholders in the company. The main feature of the first market is liquidity, where investors can easily sell their shares.

2- Securities Depositing Centre (SDC): established in May 10, 1999 to ensure safe custody of the securities ownership, also registering and transferring ownership of the securities traded in ASE, and settling the payments among brokers. The SDC is also a non-profit legal entity with financial and administrative autonomy.

3- Jordan Securities Commission (JSC): its major task is supervising the issuance of and trading securities; it also regulates and supervises the disclosure of information related to securities, issuers, insider trading and major shareholders. It also carries out the responsibility of approving the internal laws and regulations of the SDC and the ASE, and adopting accounting and auditing

standards for all entities falling under its supervision. JSC has financial and administrative autonomy and reports directly to the Prime Minister office, its board of commissioners consists of five full time members.

3.2.2 Securities Law no. 76[2]:

In 2002, the new securities law no.76 was issued, which authorized setting up other stock exchanges and allowed forming an independent investor protection fund. The new law, which came into effect on July 2004, outlines new codes of conduct that are both professional and more ethical.

Nowadays, securities are traded electronically in Amman Stock Exchange. There are now 235 companies listed in the exchange with a capitalization of more than a JD 40 billion. The ASE is considered one of the largest stock markets in the region that permits foreign investments. In the exchange there is currently 863,044 shareholders, 40.9% of which are Jordanian corporate and individual investors, 49.8% are foreign investors, and the remaining 8.2% is held by the Jordanian Investment Corporation (a branch of the Social Security Corporation). Most securities traded are equity shares, financial companies shares are the most traded (61.2%) following behind is services shares (23.2%) and industrial shares (15.6%). Table 3.1 shows key statistics of the ASE from the period 2001 to 2006:

[2] Securities Law no. 76 for 2002 is available on the Amman Stock Exchange web site: http://www.ase.com.jo/pages.php?menu_id=121&local_type=0&local_id=0&local_details=0

Table 3.1
ASE key statistics*

	2002	**2003**	**2004**	**2005**	**2006**
Number of listed companies	158	161	192	201	227
Market capitalization (JD million)	5029.0	7772.8	13033.8	26667.1	21078.2
Value traded (JD million)	950.3	1855.2	3793.2	16871.0	14209.9
No. of traded shares (million)	461.8	1008.6	1338.7	2582.6	4104.3
ASE general weighted price Index (point)	1700.2	2614.5	4245.6	8191.5	5518.1
ASE general free float weighted price index (point)	1090.9	1761.5	2729.1	4259.7	3013.7
ASE general un-weighted price index (point)	691.7	1117.5	1535.9	2171.0	1608.1
P/E ratio (times)	13.0	21.7	31.1	44.2	16.7
P/BV (times)	1.2	1.9	2.7	3.2	2.9
Dividend yield ratio (%)	3.2	2.4	1.7	1.6	2.3
Market capitalization / GDP (%)	80.4	116.8	184.7	326.6	233.9

**Source: ASE market Information available on: http://www.ase.com.jo/pages.php?menu_id=72&local_type=0&local_id=0&local_details=0.*

Table 3.2 show the percentage of foreign shareholders and the amount of their net investments (in Jordanian Dinars JD) between the periods 1996-2006 in the industrial sector. As noticed from the table, there is a 39.67% percentage change increase in number of foreign ownership of shares and a 11% increase in of foreign net investments since 1999 (establishment of ASE). Additionally, there is a 95.86% percentage change

increase in the foreign shareholders since 1996 and a 20.2% increase in their net investments.

Table 3.2
Percentage of foreign shareholders in the industrial sector [1]

Year	Percentage of foreign shareholders	Net investments (JD)[2]
1996	22%	8,521,618
1997	26 %	56,764,112
1998	28 %	122,606,446
1999	31%	15,471,248
2000	30 %	(11,833,075)
2001	27 %	(107,504,437)
2002	26 %	882,692
2003	30 %	81,889,623
2004	36%	68,956,603
2005	37 %	413,033,593
2006	43 %	180,608,977

[1] source: ASE market information, available on: www.ase.com.jo
[2] Net investment is the difference between total buying and total selling

The ASE is an active member in the Union of Arab Stock Exchanges, Federation of Euro-Asian Stock Exchanges (FEAS), and a full member of the World Federation of Exchanges (WFE), and an affiliate member of the International Organisation for Securities Commissions (IOSCO).

3.2.3 Market Segmentations:

Shares of public held companies are traded in the secondary market. This market is divided into: the first market and the second market. Companies' shares are listed in the second market after fulfilling the required regulations and requirements of all subparagraphs from articles 3, 4 and 5 of the Securities law no. 76. After that, a listing form is submitted to the ASE board, and if the board grants permission, a copy of the listing form is forwarded to the JSC.

Companies wishing to transfer from the second market to the first market must meet strict requirements and conditions set by the securities law no.76. These requirements are presented in Article 7, as follows:

a. Being listed in the second market for at least a year.

b. Net shareholders' equity must not be less than 100% of the paid in capital.

c. Achieving a pre-tax profit for at least two out three fiscal years preceding the transfer of listing.

d. The free-float of subscribed shares ratio by the end of fiscal year must not be less than 5% (if capital is JD50 million or more) or 10% (if capital is less than JD50 million) of paid-in capital.

e. Minimum number of shareholders must be 100 by the end of fiscal year.

f. Minimum days of trading shares must not be less than 20% of the overall trading days during the past 12 months, and at least 10% of the free-float shares during the same period.

The law explicitly defines the free-float shares in Article 2 as: "The number of company shares that are available for trading". The same article also specifies what shares are deemed as not free-float, this includes shares owned by the company's board of directors; shares owned by the mother, subsidiary or affiliate companies; shares owned by shareholders who own 5% or more of the company capital; shares owned by governments and public institutions; and finally treasury shares.

As mentioned above, there are strict requirements and conditions that must be met to remain listed in the first market and it is very possible to drop back to the second market. Article 8 of the securities law no.76 specified the situations in which a company will be removed from the first market and re-listed in the second market as the following:

a. If the net shareholders' equity decreased to less than 75% of the paid-in capital.

b. If the company reports losses in the last three fiscal years.

c. If the company's free float ratio shares drop to less than the minimum set in Article 7 (d) by the end of its fiscal year.

d. If the number of company shareholders drops to less than 75 by the end of its fiscal year.

e. If the days of trading on company shares over the last twelve months drop to less than the minimum set in Article 7 (f).

f. If the percentage of traded free float drops during the last twelve months to less than the minimum set in Article 7 (f) by the end of its fiscal year.

Finally, the secondary market has segments besides the one's mentioned above. The bond market; where the trading of corporate bonds takes place, although currently there are a few numbers of bonds being traded. There is also a segment specialized in transactions off the trading floor, such as inheritance and inter-family transactions.

3.2.4 Market Index:

Generally, indices measure the performance of shares in terms of return. The first index used was in 1980, at that time Amman Financial Market (AFM) selected a sample of 38 shares from companies in different sectors with a base value of 100 points to calculate an un-weighted price index, supplemented with sub-indices for four sectors: banking & finance, insurance, services and industrial.

In the early nineties, AFM started to calculate a market capitalization weighted price index, based on a sample of 50 companies (the sample increased to 60, 70, 100 companies in 1994, 2001, 2007 respectively). The market established five standards to

select the sample: market value, number of trading days, shares turnover rate, trading volume and number of traded shares.

Recently, ASE developed a new index based on the market value of the free float shares to reflect the true market performance. This index is better than the previous one in representing prices changes (movements). It also limits the effect of high value shares by giving more weight to the medium and small value shares. The basis used to select the sample of companies is similar to the one used for the Dow Jones index. Furthermore, the base value is increased to 1000 points instead of 100 points, which was used in the previous index. ASE updates the sample annually by replacing the less active shares by the more active ones.

3.3 Sample and Data:

There are three major sectors in the ASE; the financial sector which includes banks and insurance companies, the service sector and the industrial sector. Since the focus in this research is on accrual manipulation, companies from the financial and service sectors are excluded from the sample because of their different accounting practices. Therefore, the sample will only contain companies from the industrial sector that are listed in the first market.

Earnings management will be observed around a specific benchmark. This research assumes that the overall incentive that affects the companies equally and will cause the same directional response is preserving their place in the first market.

As mentioned earlier, companies listed in the first market are characterized as profitable, well managed businesses, and they meet the requirements of free-flow shares ratio, among other requirements. Investors target companies listed in the first market because of their profitability and lower risk.

The biggest challenge first market companies' face is losing their place and falling back to the second market. Any company reporting losses for three consecutive years will be dropped automatically to the second market. Such an event will harm the reputation of the manager as well as the company's. Therefore, companies listed in the first market will have a significant incentive to report profits and avoid reporting losses. On the other hand, companies listed in the second market will have a similar incentive. In other

words, if companies report profits in two out of the last three years, then they can apply to be listed in the first market, but since there are other conditions that need to be fulfilled besides reporting profits (e.g. the minimum number of outstanding shares), their application will be most likely denied. Therefore, the incentive to manipulate is assumed to be less significant for the second market companies relative to their counterparts in the first market.

There are 37 industrial companies listed in the first market. Data are collected from the financial statements of the companies included in the sample from the period 2002 to 2006[3]. One company had missing observations, therefore it was excluded. The data collected is arranged based on a cross sectional format, leading to a total of 180 firm-year observations from 36 companies. The reason of choosing data from this period is because the ASE was established in 1999 and since then the amount of investments from local and foreign investors has increased, managers are more motivated to preserve their company's profitable image.

3.4 Descriptive statistics:

Table 3.3 provides descriptive statistics for the sample from the period 2002 to 2006. Companies in the sample hold a high percentage of current assets in their balance sheets, mostly in the form of debtors and stock. The mean value of current assets is roughly stable during the five years (%55). The importance of high percentage of current assets comes from the availability of accruals or accounting instruments that would make it easier for managers employing them to manipulate reported earnings. In other words, and other things being constant, managers of the companies included in the sample have the proper amount of accounting technology and instruments to manipulate earnings.

The earnings to total accruals ratio during the five years shows high variation in each year, and there is no clear pattern from one period to another. It can be noticed in 2002 the mean value of earnings before taxes to total accruals is (7.90) and in 2006 the mean is (0.455).

[3] Financial statements are available for free download on ASE website on the following link: http://www.ase.com.jo/downloads.php?path=downloads/Companies%20Guide/. Appendix A1 explains how data is manipulated and organised.

Table 3.3
Descriptive statistics of sample[1]

	2002	2003	2004	2005	2006
Current assets					
Mean	0.540	0.524	0.550	0.560	0.520
Median	0.560	0.520	0.550	0.560	0.550
Variance	0.037	0.034	0.035	0.039	0.047
Std. Deviation	0.193	0.185	0.186	0.197	0.216
Current liabilities					
Mean	0.200	0.200	0.220	0.220	0.250
Median	0.150	0.018	0.190	0.210	0.240
Variance	0.014	0.013	0.020	0.019	0.025
Std. Deviation	0.119	0.112	0.140	0.138	0.158
ROA [2]					
Mean	0.075	0.069	0.079	0.078	0.057
Median	0.069	0.069	0.082	0.078	0.047
Variance	0.005	0.005	0.005	0.005	0.005
Std. Deviation	0.069	0.067	0.069	0.069	0.074
Operating cash flow					
Mean	0.117	0.077	0.024	0.033	0.077
Median	0.110	0.084	0.017	0.042	0.089
Variance	0.014	0.009	0.011	0.014	0.010
Std. Deviation	0.120	0.095	0.104	0.118	0.103
Total accruals [3]					
Mean	-0.042	-0.007	0.056	0.045	0.021
Median	-0.040	-0.008	0.050	0.059	0.009
Variance	0.012	0.012	0.011	0.009	0.012
Std. Deviation	0.111	0.108	0.106	0.097	0.111
Earnings to total accruals					
Mean	7.900	0.38	0.780	1.960	0.455
Median	0.200	0.105	0.685	0.480	0.210
Variance	1081	18.260	12.500	127	10.010
Std. Deviation	32.870	4.270	3.500	11.250	3.160

[1]All variables are displayed as percentage to total assets in period t.
[2]Earnings before tax to total assets.
[3]Total accruals = net income before taxes – operating cash flows

Table 3.4 describes the key variables included in the model. It can be noticed that change in sales revenue and change in debtors are the highest in 2004 and 2005, while fixed assets is relatively stable suggesting there is no unusual growth in the size of firms during the five year period.

Table 3.4
Descriptive statistics on key variables*

	2002	2003	2004	2005	2006
Change in Sales Revenue					
Mean	0.048	0.039	0.117	0.110	0.064
Median	0.003	0.045	0.084	0.055	0.020
Std. Deviation	0.164	0.232	0.193	0.215	0.262
Fixed assets (PPE)					
Mean	0.360	0.366	0.362	0.440	0.293
Median	0.331	0.332	0.325	0.301	0.281
Std. Deviation	0.222	0.223	0.213	0.754	0.168
Change in Debtors					
Mean	0.004	0.009	0.019	0.030	-0.015
Median	0.005	-0.001	0.012	0.016	-0.001
Std. Deviation	0.049	0.059	0.052	0.071	0.104

** All variables are scaled by total assets in period t-1*

3.5 Measurement of variables:

In this study, earnings are measured as net income before taxes. Cash flows are measured as net cash flows from operating activities. Therefore, total accruals are measured as the difference between operating cash flows and earnings as in Healy (1985), DeAngelo (1986), DeFond & Jiambalvo (1994) and Subramanyam, (1996). Firm and time subscripts are omitted for convenience:

(eq. 3.1)

Total accruals are decomposed into nondiscretionary accruals and discretionary accruals:

(eq. 3.2)

Nondiscretionary accruals relate to the normal level of the firm's performance and are measured by the change in sales revenue (ΔREV) and property, plant and equipment (PPE) (Jones, 1991; Dechow et al., 1995). In this study change in sales revenue is measured as the difference between net sales in period (t) minus net sales in period (t-1):

$$\Delta REV = \text{Net Sales}_t - \text{Net Sales}_{t-1} \qquad \text{(eq. 3.3)}$$

Property, plant and equipment are measured as net fixed assets in period (t) to control for the depreciation expense. Change in debtors is measured as the difference between net debtors in period (t) and net debtors in (t-1):

$$\Delta DRS = DRS_t - DRS_{t-1} \qquad \text{(eq. 3.4)}$$

All variables are taken directly from the financial statements of the companies. Financial statements are available from the Amman Stock Exchange as mentioned in the previous section.

3.6 Hypothesis formulation:

As mentioned in chapter two, the cross-sectional version of the Jones model captures discretionary accruals using the residuals. The residuals cannot be used as a measure for earnings management since they represent the stochastic error term that is normally distributed with mean zero.

Using the standard Jones model as it is for this research will produce a result that will suggest that some companies listed in the first market manage their earnings upward and some manage downward simultaneously, and on average they sum to zero. This implies that there are two incentives driving the companies in the first market to manipulate in different directions. But through careful examination of the companies listed in the first market, the researcher found that the major incentive is to avoid reporting losses. Thus, it is assumed that companies reporting a loss will manipulate upward to report profits in the following year, so the importance of the zero benchmark becomes more evident for the listed companies. Hence, the main focus of this research is to detect and measure earnings management around this specific benchmark, and it is assumed that only the companies that respond to this incentive will manipulate upwards. As a result, the standard Jones model (with no adjustment) will not be sufficient for this study.

The model proposed in this research is based on the Jones model (Jones, 1991), but extended to include a single accrual account, which is change in debtors, to capture the discretionary accrual manipulation. The justification of choosing the change in debtors as the single accrual to manipulate is because it serves two purposes; the first is that it

captures early sales recognition, the other is it captures bad debt expense manipulation. Early sales recognition will be most likely in the form of credit sales, and it will be reflected directly in the sales and debtors accounts, thus increasing the operating profit in a given year. Additionally, managers can re-estimate the percentage of bad debts expense by reducing it to decrease expenses, which in turn, will increase the profits as well. However, bad debt expense manipulation will probably be small and insufficient to achieve required target of manipulation. Moreover, this modified version of the Jones model explicitly assumes that only firms with the same incentive will manipulate upwards, while other firms that do not share the same incentive might not manage their earnings at all. Therefore, a dummy variable representing the incentive is included to the model and multiplied with change in debtors. The dummy variable equals one if a company reports a loss in the previous year and zero otherwise. The product of the dummy variable and change in debtors is the measurement for discretionary accruals, rather than the residual term. This research assumes that the major incentive for companies listed in the first market in ASE is reporting a profit in order to remain listed. As a result, a company that reports a loss in any period between 2002 and 2006 will manage their earnings upwards to report a profit.

Although a company will be removed from the first market if it reports losses for three consecutive years. However, the assumption here is that managers will manipulate their earnings in the year following a loss. Managers will not wait for two successive loss years and manage their earnings in the third year; doing so might attract unwanted attention and could even be easier for the auditors to prevent such manipulation. Moreover, these companies report a loss because by the time they realize this result, it will be too late for them to manipulate. Thus, the underlying assumption is managers will take no risks and simply manipulate in the year following a loss.

The null hypothesis tested in this research is:

H_o: companies reporting a loss will not manage their earnings in the following year using debtors.

The proposed model of this research is:

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta DRS_{it}}{A_{t-1}}) + \varepsilon_{it}$$

Where:

TA_{it}: total accruals for firm i in year t.

ΔREV_{it}: change in sales revenue for firm i in year t.

PPE_{it}: property, plant and equipment for firm i in year t.

ΔDRS_{it}: change in net debtors for firm i in year t.

D: dummy variable that equals 1 if the company reports a loss in the previous year, 0 otherwise.

A_{t-1}: total assets for firm i in year t, is the scale variable to reduce heteroskedasticity.

Change in sales revenue and fixed assets captures nondiscretionary (normal) accruals including the normal level of change in debtors. The unexplained (extra) amount of total accruals is explained by discretionary (abnormal) accruals. Therefore, earnings management is captured by the change in debtors for companies reporting a loss in the previous period, and companies that do not report a loss will not manage their earnings.

3.7 Results of earnings management:

The regression results are displayed in Table 3.5; all variables appear statistically significant at a 1% significance level. The change in revenue coefficient is 0.226 and the fixed assets coefficient is -0.047 and negative, which is the expected sign since PPE controls for the depreciation expense.

The dummy variable (D) equals 1 if the company reports a loss in the previous year is multiplied with the change in debtors; and the product represents the discretionary accruals. The results show that the coefficient for the discretionary accrual is 2.318, which indicates that companies reporting a loss in the previous year manage their earnings in the following year to report profits. Thus, by reporting a profit the company needs to worry less for next period's earnings, since they will be removed from the first

market if they report losses for three years in a row. Reporting a profit in the year following a loss breaks the pattern and reduces the pressure on the management in following periods.

Table 3.5
Results for one year loss

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta DRS_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D*\Delta DRS_{it}$	Adj-R^2
Coefficient	126872.2	0.226	-0.047	2.318	21.49%
t value	(2.558)*	(6.244)**	(-2.795)**	(3.321)**	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in net debtors for firm i in year t,
D: dummy variable that equals 1 if the company reports a loss in the previous year, 0 otherwise.
All variables are scaled by total assets in (t-1) to reduce heteroskedasticity.
*t values at 5% significance level.
** t values at 1% significance level.
(D*ΔDRS) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

Therefore, the null hypothesis of no earnings management is rejected. The results support the assumption that earnings management is taking place in first market for companies reporting a loss in the previous year. The change in sales revenue represents the nondiscretionary component of sales revenue that companies recognise. In other words, this amount is the normal level of sales. The abnormal level of sales comes in the form of abnormal credit sales; therefore the debtors account will be abnormally large (Marquardt & Wiedman, 2004). The change in debtors for the manipulators is significant which indicates that these companies recognised early sales in order to boost revenues and as a result increase net income. Managers manipulate revenues by accelerating the recognition of sales through speeding up the shipment and delivery of goods sold and pushing down unwanted in goods to retailers or in other words “channel stuffing” (Caylor, 2010). Change in debtors can also be used as a tool to manage bad debt expense downward to increase profits. Managers can deflate bad debt expense in periods where earnings need a boost (Jackson & Liu, 2009). Hence, having change in debtors significant means that companies reporting a loss in the previous period can manage earnings upward through revenue manipulation and through expense manipulation. The main importance of these results is providing evidence for using a single accrual account to achieve the required manipulation and by using a variable representing an incentive that sets a benchmark for earnings management for companies

listed in the first market in the ASE. This benchmark can be used to identity manipulating companies and makes it easier to detect earnings management behaviour in the future.

The above results indicate that any company that reports a loss in the previous year will manipulate to report a profit. Thus, the dummy variable points out those companies that report a loss in the previous year regardless whether they report a profit or not in the year following the loss. In other words, the dummy variable (D) does not separate between companies that reverse their losses and companies that do not reverse losses in the year of manipulation (i.e. period after the loss year). Therefore, two dummies are constructed to separate between companies that manipulate to report profits and companies that report losses for the second year. The two dummies are based on the general condition set by the original dummy variable (D). The first dummy (D_P) equals one if the company reports a loss in the previous period and a profit in the current period, in other words (D_P) indicates companies that manipulate *successfully* to report a profit. The second dummy (D_L) equals one if the company reports a loss in the previous period and a loss in the current period, this dummy variable represents those companies that are *unsuccessful*. Table 3.6 displays results for these two conditions.

Table 3.6
Results for successful and unsuccessful companies

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D`_P * \Delta DRS_{it}}{A_{t-1}}) + \lambda(\frac{D`_L * \Delta DRS_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_P*\Delta DRS_{it}$	$D_L*\Delta DRS_{it}$	Adj-R^2
Coefficient	122392.4	0.228	-0.047	2.464	1.720	21.12%
t value	(2.407)	(6.236)	(-2.786)	(3.155)	(1.087)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in net debtors for firm i in year t,
D_P: dummy variable that equals 1 if the company reports a loss in the previous period AND a profit in current period, 0 otherwise.
D_L: dummy variable that equals 1 if the company reports a loss in previous period, AND a loss in current period, 0 otherwise.
*t values at 5% significance level.
** t values at 1% significance level.
All variables are scaled by total assets in period (t-1) to reduce heteroskedasticity.

The results show the discretionary accruals for successful companies ($D_P*\Delta DRS_{it}$) is significant which means that these companies manipulate following a loss to report profits and as a result decrease the probability of being delisted. The interesting result is the insignificance of the discretionary accruals measure for unsuccessful companies.

This probably suggests that these companies decided not to manipulate and place real effort to report profits, but they still reported losses. If these companies report losses again in the following year then they will be delisted from the first market. However, since the sample of this research shows no change in the listed companies for the first market, it indicates that these companies reported profits after two years of consecutive losses and remained listed. Based on that, a new dummy must be added to the model to examine the discretionary accruals for companies that report profits after two-year losses. The model will show the discretionary accruals for three cases; companies that manipulate after a loss and report a profit; companies that report a loss in previous year and do not manipulate in current year and still report a loss (as in Table 3.6); and companies that report a profit after two consecutive losses. Results are shown in Table 3.7.

Table 3.7
Results for successful and unsuccessful companies and companies reporting a profit after two losses

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_P*\Delta DRS_i$	$D_L*\Delta DRS_{it}$	$D_{LL}*\Delta DRS_{it}$	Adj-R^2
Coefficient	122044	0.228	-0.047	2.464	1.717	0.0141	20.67%
t value	(2.318)*	(6.21)**	(-2.77)**	(3.145)**	(1.080)	(0.026)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in net debtors for firm i in year t,
D_P: dummy variable that equals 1 if the company reports a loss in the previous period AND a profit in current period, 0 otherwise.
D_L: dummy variable that equals 1 if the company reports a loss in previous period, AND a loss in current period, 0 otherwise.
D_{LL}: dummy variable that equals 1 if the company reports two consecutive losses, AND a profit in current period, 0 otherwise.

All variables are scaled by total assets in period (t-1) to reduce heteroskedasticity.
*t values at 5% significance level.
** t values at 1% significance level.

The results are the same as before for successful and unsuccessful companies, but with further explanation for unsuccessful companies. The companies that did not manipulate in the period following a loss and still reported a loss will be delisted if they report a third loss. However, these companies reported a profit after two-year losses and preserved there place in the first market. The discretionary accruals for these companies ($D_{LL}*\Delta DRS_{it}$) is not significant which means that they did not manipulate to report profits even after two consecutive losses. Taken all together, these results show that

most companies listed in the first market manipulate directly after a loss year to report profits. However, some companies do not manipulate after a loss and still report a loss. Eventually these few companies report profits after two consecutive losses and remain listed in the first market. The results suggest that the profits are not a product of manipulation, which means that the company placed real efforts by selling more goods to new customers. Another possible explanation is *real* earnings management, which differs from accrual manipulation. *Real* earnings management is taking actual steps to increase profits. For example, providing favourable credit terms, lowering credit restrictions, lowering prices and offering discounts; as a result actual sales will increase (Caylor, 2010; Roychowdhury, 2006). However, real earnings management is beyond the scope of the model applied in this research, which only models accrual manipulation.

3.8 Tests for "Big Bath" and "Accrual reversal":

From the previous results, companies that report a loss manipulate directly to report profits. The main tool of manipulation is through early credit sales recognition. However, the above results do not explain from which period the company shifted the sales, since earnings management is basically shifting revenues and expenses between periods. Sales could have been deferred from the loss period to current period or sales taken from the following period could have been recognised early in the current period (the current period being the event period or the manipulation year). The two cases cannot take place simultaneously since it will be more costly in terms of cash flows. Therefore, sales are either taken from the loss year, which would result in a big bath in the loss year or taken from the year following the manipulation period, which would result in accrual reversal in that year.

Basically, a big bath technique is maximising the loss in a particular year, either by accelerating bad debt expenses (e.g. write-offs) and/or deferring revenues, to increase the probability of reporting a profit in subsequent periods. Deferring sales is accomplished when cash is received but the goods are not yet shipped or delivered to buyers. Hence, managers can postpone the delivery of goods and recognise the sales revenue in the following year. Managers use this technique when they will report a loss despite the amount of upward manipulation. Companies' reporting a loss means that it is too late to manipulate and/or the manipulation will not be sufficient or successful for

companies to turn themselves around. Therefore, companies undergo reporting losses but maximising the amount of losses by managing their earnings downward. This will make it easier to report profits in the following period. In other words, the companies are hypothesised to take a big bath in the loss year. The alternative case is not taking a big bath and reporting the normal level of losses but recognising sales earlier during the period following the loss year. This becomes the case if the company decides not to take a big bath in the loss year, or they realised they will report a loss and it's too late for them to manipulate or take a big bath. Therefore, the company in this case will recognise sales early by shifting them from the following period. In other words, the company will report a loss taking no action and manipulate in the period following the loss through early sales recognition.

The effect of a big bath will be shown in an abnormally low debtors account because sales are deferred to the next period. For companies that report a loss, the change in debtors in the loss year is expected to be negative. On the other hand, early sales recognition will have a significant effect on the sales account from the period following the manipulation year and the sign of change in sales for companies that manipulate in current period is expected to be negative.

First, companies are tested for big bath by constructing a new dummy variable to indicate the loss year. The dummy variable (D_{BB}) will equal 1 if the company reports a loss in the *current* period and 0 otherwise. The tool of manipulation is the change in debtors; the debtors account will be abnormally low in the loss year because a large portion of credit sales are deferred to the following period. Based on that, the sign of the coefficient of the discretionary accrual measure (the product of the dummy variable and change in debtors) is expected to be negative, as a result of deferring sales to the next period. The sign will also be negative if the company accelerates bad debts expenses as well. The model will include two dummy variables; (D_P) to indicate companies that report a profit after a loss and (D_{BB}) to indicate the loss year. Results are shown in the following table.

Table 3.8
Results for *big bath* in the loss period

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D`_P * \Delta DRS_{it}}{A_{t-1}}) + \lambda(\frac{D`_{BB} * \Delta DRS_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_P*\Delta DRS_{it}$	$D_{BB}*\Delta DRS_{it}$	Adj-R^2
Coefficient	110420.3	0.230	-0.046	2.465	2.492	21.00%
t value	(2.234)*	(6.287)**	(-2.718)**	(3.154)**	(0.944)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in net debtors for firm i in year t,
D_P: dummy variable that equals 1 if the company reports a loss in previous year and profits in current year, 0 otherwise.
D_{BB}: dummy variable that equals 1 if the company reports a loss in current period, 0 otherwise.

All variables are scaled by total assets in period (t-1) to reduce heteroskedasticity.
*t values at 5% significance level.
** t values at 1% significance level.
($D_{BB}*\Delta DRS$) is the variable used as a measure for big bath for firm *i* in year t.

The results show no indication of big bath. The discretionary accruals for the companies in the loss year are neither significant nor negative. This indicates that the companies did not take any action during the loss year, either because companies realized they will report losses in a late stage during the year and there is no time to manipulate either upward or downward or they simply postponed the manipulation for next year. Results in Table 3.5 and Table 3.7 support the latter explanation that all manipulation takes place in the period following the loss year through early recognition of sales. In order to test this, a different dummy variable will be added to the model instead of (D_{BB}). The new dummy will indicate the period after the manipulation year to detect any reversal of accruals as a consequence of manipulation. The dummy variable (D_R) will indicate the period in which companies report a profit after the manipulation period. In other words, this condition holds "True" for companies that report a loss then a profit then another profit. The tool used to detect any reversal is the change in sales revenue because early sales recognition means that companies shifted sales from next year to the current year (i.e. year of manipulation). Therefore, the change in sales revenue in the following year will be abnormally low (negative). Results are displayed in the following table.

Table 3.9
Results for Accruals reversal

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D`_P * \Delta DRS_{it}}{A_{t-1}}) + \lambda(\frac{D`_R * \Delta DRS_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_P*\Delta DRS_{it}$	$D_R*\Delta DRS_{it}$	Adj-R^2
Coefficient	101250.6	0.266	-0.0515	2.575	-0.259	23.14%
t value	(2.073)*	(6.829)**	(-3.082)**	(3.334)**	(-2.411)**	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in net debtors for firm i in year t,
D_P: dummy variable that equals 1 if the company reports a loss in previous year and profits in current year, 0 otherwise.
D_R: dummy variable that equals 1 if the company reports a profit for the second year after a loss, 0 otherwise.
(D_R = 1 if the condition is Loss, Profit, Profit)
All variables are scaled by total assets in period (t-1) to reduce heteroskedasticity.
*t values at 5% significance level.
** t values at 1% significance level.
($D_R*\Delta DRS$) is the variable used as a measure for accrual reversal for firm *i* in year t.

As expected, the manipulation that took place after a loss year is achieved through early recognition of sales. The discretionary accruals measure for companies that manipulated in the previous year is significantly negative as a consequence of having a negative change in sales.

To summarise, companies manipulate directly after reporting a loss; however, a few companies did not manipulate after reporting a loss and as a result they reported a second loss. Eventually, they did report profits and remained listed in the first market although the profits are not a result of accrual manipulation. Most companies did report profits through earnings management after reporting losses, the manipulation is mainly achieved through early recognition of sales and as a result the sales account in the next period is abnormally low.

3.9 Simulation tests:

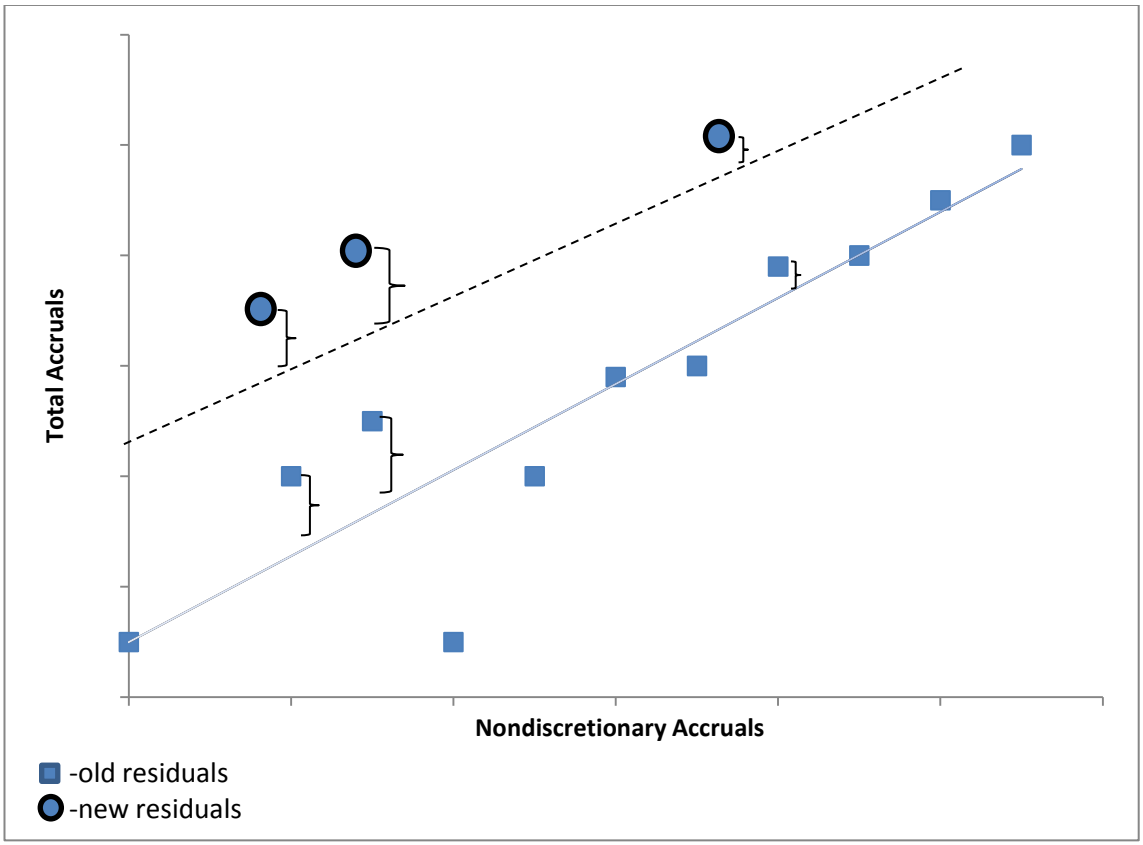
In previous studies, any modification to the Jones model is evaluated in terms of the specification and power (i.e. type I and type II error) of the model against other versions of the Jones model or other models, using statistical simulation procedures (Dechow et al., (1995); Kothari et al., (2005); Ibrahim (2009)).

The simulations are mainly based on selecting a sample of firm-years observations under the assumption that it contains no earnings management. The following step is randomly introducing a fixed amount (e.g. 5% of total assets) that represents the manipulation. This set of data is used for each model to assess its specification and power in order to find out the best model that detects earnings management.

The introduced amount is randomly spread into the data, and the model is applied to measure or control for the nondiscretionary accruals. The residuals from the applied model are then regressed on a dummy variable that equals 1 for firms where earnings management is introduced by the researcher. The coefficient on the dummy variable is expected to be significant for firms with earnings management, and roughly equal to the amount of the inserted manipulation. However, in this research the main argument is the residuals from the Jones model are not the proper measure for discretionary accruals. The simulation tests in previous studies did not take into consideration the behaviour of residuals before and after introducing a fixed amount (the manipulation) into the dataset. In other words, the simulation tests did not compare between the old residuals (before the insertion) and the new residuals (after the insertion). Moreover, the tests did not examine the regression line to see whether adding a fixed amount will cause the line to shift or change its slope.

To illustrate the effect of the added amount on the regression line, the following figure demonstrates regressing total accruals on nondiscretionary accruals (change in sales and fixed assets).

Figure (3.1)



The straight line represents the regression line before adding a fixed amount as earnings management. As noticed from the figure, some residuals (square shape) are above the line and some residuals are below the line. These residuals do not represent the manipulation and are assumed to have equal variance (i.e. homoscedastic) across the line. The dashed line represents the new regression line after adding a fixed amount that represents earnings management. The circle shapes are the new residuals that result from the added manipulation. The regression line shifts upwards to meet with the added amount, and the new residuals are now assumed to contain earnings management. However, the distance between the old residuals above the line is roughly equal to the new residuals above the second line, in other words, both set of residuals are the same. Therefore, when regressing the new residuals on the dummy variable (e.g. *PART* in previous studies), it will be picking up the same residuals as before adding in the manipulation. Moreover, the old residuals below the line becomes even smaller (more negative) after the regression line shifts upwards.

The whole regression line in the above illustration shifted up because the added manipulation is inserted *randomly* across the sample. If the added amount is inserted in

the first 10th percentile of total accruals for example, then the whole line will not shift but the slope of the line will change. However, there is no reason to assume that the manipulation will be random across the sample; it might be confined to a certain group of companies. Therefore, in order to take the change of the slope into consideration, a simulation is designed where it is assumed that the standard Jones model is the perfect fit (i.e. R^2 is 1). The data used in this simulation are the firm-years observations for listed companies in the first market that did not report a loss in the previous year. The firms that report a profit after a loss year in order to remain listed in the first market are removed. Thus, the assumption is that this dataset contains no earnings management.

The next step is assigning the coefficients a fixed value, so that when total accruals is regressed on change in sales and fixed assets, the R^2 will equal 1 and there will be no residuals. This regression will show that there are no discretionary accruals and nondiscretionary accruals explain all the variation in total accruals. Results for this regression are displayed in the following table:

Table 3.10
Results for standard Jones model as perfect fit

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	Adj-R^2
Coefficient	224124	0.244	-0.037	100.00%
p value	(0.000)	(0.000)	(0.000)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,

All variables are scaled by total assets in t-1 to reduce heteroskedasticity.

p values are set at 1% significance level.

The following step is inserting 5% of total assets to the first 25th percentile of total accruals. This amount will represent the discretionary accruals or the manipulation. By doing so, the slope of the regression line will change, but it will not shift. The model is applied again and the resulting residuals will be used in the following step.

Table 3.11
Results for standard Jones model after adding 5% of total assets

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	Adj-R^2
Coefficient	183540.56	0.195	-0.026	87.63%
p value	(0.000)	(0.000)	(0.000)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,

All variables are scaled by total assets in t-1 to reduce heteroskedasticity.

p values are set at 1% significance level.

After that, a dummy variable (consistent with previous studies, it is labelled *PART*) is constructed and equals 1 for firms where earnings management is inserted by the researcher. The residuals from the previous step is regressed on *PART*, results are displayed in the following table.

Table 3.12
Results for regressing residuals on *PART*

$$\varepsilon_{it} = \alpha + \beta PART_{it} + \nu_{it}$$

	α	β	Adj-R^2
Coefficient	-0.008	0.034	67.28%
p value	(0.000)	(0.000)	

ε_{it} is residuals taken from the Standard Jones model for firm i in year t, after adding 5% of assets.
$PART_{it}$: dummy variable that equals 1 for firms where earnings management is inserted by researcher, 0 otherwise.

p values are set at 1% significance level.

Although the coefficient on *PART* is significant, it still did not capture the entire manipulation amount. The expected value of the coefficient is expected to be 5%, which equals the exact same amount inserted to total accruals.

In order to evaluate the Jones model as it is extended in this research, the dummy variable should only represent earnings management without any error. Following the same procedures above, except the dummy variable (*PART*) is added to the original model as an additional regressor. Any resulting residuals will represent only white noise and not manipulation. The model will be:

Where:

TA_{it}: total accruals for firm *i* in year t.

ΔREV_{it}: change in sales revenue for firm *i* in year t.

PPE_{it}: fixed assets for firm *i* in year t.

PART: dummy variable equals 1 for firms where earnings management is inserted by researcher.

A_{t-1}: total assets for firm i in year t, is the scale variable to reduce heteroskedasticity.

μ_{it}: error term.

In Table 3.11 above, results show the coefficients for the standard Jones model and the R^2 is 87.63%. This is the outcome of adding manipulation to a dataset where there is no earnings management and nondiscretionary accruals explain all of the variation in total accruals. The modified model is applied on this dataset, where 5% of assets are added to the first 25th percentile of total accruals. Results are shown the following table.

Table 3.13
Results for the extended version of the Jones model

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	PART	Adj-R^2
Coefficient	224124	0.244	-0.037	0.050	100.00%
p value	(0.000)	(0.000)	(0.000)	(0.000)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
PART: dummy variable equals 1 for firms where earnings management is added by the researcher, 0 otherwise.

All variables are scaled by total assets in t-1 to reduce heteroskedasticity.

p values are set at 1% significance level.

As expected, the dummy variable (*PART*) picked up all the manipulation. The coefficient is 5% which is equal to the added amount that represents earnings management. Additionally, the R^2 is 1 again, and there are no residuals. Therefore, by adding (*PART*) as an additional regressor, the model explains all the variation in total accruals. Change in sales and fixed assets explain the nondiscretionary accruals and (*PART*) explains the discretionary accruals.

To examine the change in the slope from a different perspective, the amount of manipulation is added to the upper percentile of total accruals. That is, 5% of total assets are added to the 75th percentile of total accruals. Same as before, the standard Jones model is applied and the resulting residuals are regressed on the dummy variable (*PART*). The following table shows the results for regressing the residuals on (*PART*):

Table 3.14
Results for regressing residuals on *PART*

$$\varepsilon_{it} = \alpha + \beta PART_{it} + v_{it}$$

	α	β	Adj-R^2
Coefficient	-0.005	0.022	43.00%
p value	(0.000)	(0.000)	

ε_{it} is residuals taken from the Standard Jones model for firm i in year t, after adding 5% of assets to the 75th percentile of total accruals.
PART $_{it}$: dummy variable that equals 1 for firms where earnings management is inserted by researcher, 0 otherwise.

p values are set at 1% significance level.

Now, the dummy variable (*PART*) is added as an additional regressor to the model. The following model displays the results:

Table 3.15
Results for the extended version of the Jones model

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	PART	Adj-R^2
Coefficient	224124	0.244	-0.037	0.050	100.00%
p value	(0.000)	(0.000)	(0.000)	(0.000)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
PART: dummy variable equals 1 for firms where earnings management is added by the researcher, 0 otherwise.

All variables are scaled by total assets in t-1 to reduce heteroskedasticity.

p values are set at 1% significance level.

The residuals did not pick up all the inserted manipulation; it only detects roughly 2%. On the other hand, when using (PART) in the model it detects all the added earnings management (coefficient is equal to 5%).

Up to this point, the inserted earnings management is added in a systematic way (either to the 25th or the 75th percentiles of total accruals). The next step is to evaluate the model where earnings management is inserted randomly to total accruals. The

evaluation is based on two levels of randomly added manipulation to a dataset where there is no earnings management (i.e. the Jones model is a perfect fit). The first level is adding 5% of total assets randomly to 4% of the data. The following table shows results for regressing the residuals on (PART) in panel (A) and using (PART) as additional regressor in panel (B):

Table 3.16
Results for the two models when inserting manipulation randomly
Panel (A)
Results for regressing residuals on *PART*

$$\varepsilon_{it} = \alpha + \beta PART_{it} + \nu_{it}$$

	α	β	Adj-R^2
Coefficient	-0.002	0.049	99.70%
p value	(0.000)	(0.000)	

ε_{it} is residuals taken from the Standard Jones model for firm i in year t, after adding 5% of assets randomly to 4% of total accruals.
$PART_{it}$: dummy variable that equals 1 for firms where earnings management is inserted by researcher, 0 otherwise.

p values are set at 1% significance level.

Panel (B) Results for the extended model

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	PART	Adj-R^2
Coefficient	224124	0.244	-0.037	0.050	100.00%
p value	(0.000)	(0.000)	(0.000)	(0.000)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
PART: dummy variable equals 1 for firms where earnings management is added by the researcher, 0 otherwise.

All variables are scaled by total assets in t-1 to reduce heteroskedasticity.

p values are set at 1% significance level.

The coefficient on (PART) is 4.98% which is close in value to the added amount. However, when adding (PART) as an additional regressor it detects the exact same amount. Therefore, the detection process is different when adding earnings management in a particular method from adding it randomly. Similar results are obtained when adding 5% of assets to 25% of total accruals.

In order to evaluate the Jones model as modified in this research, 25% of change in debtors is added to total accruals. The procedures are the same as above, except adding a fixed percentage of change in debtors to total accruals instead of adding a fixed percentage of total assets. By doing so, the amount added will be much smaller than before because total assets are much larger than debtors. This will assist in evaluating the model of this research in detecting smaller amounts of earnings management.

Again as before, a dummy variable (*PART*) is constructed that equals 1 for firms where the manipulation is added by the researcher. The added amount of change in debtors represents revenue manipulation through early sales recognition. The standard Jones model's coefficients are set using fixed amounts so that the model will be a perfect fit (same as Table 3.10 and R^2 equals 1). After adding 25% of change in debtors to total accruals, the R^2 will decrease because the nondiscretionary accruals no longer explain all the variation in total accruals; the results are shown in Table 3.17.

Table 3.17
Results for standard Jones model after adding 25% of change in debtors

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	Adj-R^2
Coefficient	228188.435	0.264	-0.037	97.68%
p value	(0.000)	(0.000)	(0.000)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,

All variables are scaled by total assets in t-1 to reduce heteroskedasticity.

p values are set at 1% significance level.

The R^2 decreased by a small amount compared to the decrease in R^2 when 5% of total assets is added (87.63% in Table 3.11 compared to 97.68%). This shows that the added manipulation is much smaller in this case and represents a strong challenge to the model to detect small amounts of earnings management.

The residuals from the standard Jones model in Table 3.17 are regressed on the dummy variable (*PART*). If the residuals are detecting the manipulation, then the coefficient on (*PART*) should be (0.25), which is the added amount. Results for regression of the residuals on (*PART*) are shown in the following table.

Table 3.18
Results for regressing residuals on *PART*

$$\varepsilon_{it} = \alpha + \beta PART_{it} + \nu_{it}$$

	α	β	Adj-R^2
Coefficient	-0.006	0.010	28.24%
p value	(0.000)	(0.000)	

ε_{it} is residuals taken from the Jones model for firm i in year t, after adding 25% of change in debtors.
PART $_{it}$: dummy variable that equals 1 for firms where earnings management is inserted by researcher, 0 otherwise.

p values are set at 1% significance level.

The dummy variable is significant but the coefficient does not equal the added amount. This is additional evidence that the residuals are poor measures for discretionary accruals. Therefore, discretionary accruals will be measured by multiplying the dummy variable with change in debtors (*PART**ΔDebtors). This composite variable will be added as an additional regressor to the standard Jones model. Thus, total accruals will equal nondiscretionary accruals plus discretionary accruals, and any remaining residuals will only represent white noise. Results for this model are displayed in the following table.

Table 3.19
Results for the model with measure of discretionary accruals as additional regressor

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$PART*\Delta DRS_{it}$	Adj-R^2
Coefficient	224124	0.244	-0.037	0.250	100.00%
p value	(0.000)	(0.000)	(0.000)	(0.000)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS: change in debtors for firms i in year t,
PART: dummy variable equals 1 for firms where earnings management is added by the researcher, 0 otherwise.

All variables are scaled by total assets in t-1 to reduce heteroskedasticity.

p values are set at 1% significance level.

The coefficient on the discretionary accruals measure is the exact amount of manipulation added (25%). Additionally, the R^2 is 1 again, which indicates that this composite variable picked up all the added earnings management.

In conclusion, the results show that when the inserted manipulation does not disturb the Jones regression slope line, then the residuals are a fair proxy for the inserted manipulation. On the other hand, when the inserted manipulation is not well dispersed

across the sample, the Jones regression slope line is disturbed and the residuals become a poor proxy for the manipulation. When the inserted manipulation are well dispersed but numerous, then the Jones regression line shifts upward and although the ranking of the residuals reflects the inserted manipulation, the actual values of the residuals do not. However, there is no reason to assume that the manipulation will be spread randomly across the sample and that all companies will manipulate earnings in the same amount.

3.10 Conclusion:

Earnings management is one of the most popular research areas in financial accounting. The method of utilizing the accrual system to manipulate the reported earnings is quite interesting and fascinating for researchers. The main objective of the accrual system is to produce accurate measures and reports about the firm's performance.

Many methods and models are used in the literature to detect earnings management. The noticeable thing from previous studies is all papers examine the reason or the motive to understand the source of earnings management. Therefore, most studies look first for the motives and incentives and then try to detect earnings management.

The Jones model is one of the most models used in literature, because its underlying concept is very logical; control for normal accruals and any unexplained levels of accruals are attributed to earnings management. The problem with the Jones model is its application on cross-sectional data. Using the residual term, which will average to zero, as the measure for discretionary accruals is not a reliable method, because the model does not control for all levels of nondiscretionary accruals, and as a result, it is not the best fit model (i.e. does not produce a R^2 equal to 1). Therefore, the residuals from this model might capture noise while trying to measure the discretionary accruals. Moreover, the assumption that some companies are manipulating upwards and some companies are manipulating downwards simultaneously, is neither a justified nor a reasonable assumption. Companies in the same industry usually follow each other as a herding reaction, if an opportunity to manipulate for one company is available, then what will stop other companies to follow (see Fields et al., 2001, pp. 289).

To assume, for the sake of argument, that the residuals are a good proxy for discretionary accruals, it still does not tell the whole story of how earnings management takes place. In other words, it will not give any indications on the instrument(s) managers use for the purpose of manipulation. More information is needed at this stage of earnings management literature to specify the accrual accounts managers use frequently to manipulate, and to determine whether they use one or a number of accruals.

In this research, the Jones model is extended to contain an accrual account and an incentive that will replace the residuals as a measure for earnings management. By

doing so, the instrument used to manipulate earnings can be examined. The model further contains a variable that represents the incentive that drives earnings management, which narrows down the detection for only companies that share equal motives. Thus, the model used in this research is assumed to tell the whole story; it shows the variables for the normal level of accruals, it specifies the extra (abnormal) level of accruals and it determines the incentive that is motivating managers to manipulate.

The model is applied using cross-sectional data from listed companies in the Amman Stock Exchange (ASE). The main market is the first market and it contains the most profitable companies, but companies that report losses three years in a row will be removed from the first market and listed in the second market. If that occurs, it can damage the firm's profitable image as well as the reputation of the manager. Thus, this represents a major incentive, and managers will do everything and anything to report a profit, even if the profit figure is above zero by 1 JD.

The results support the earnings management hypothesis, and shows that companies listed in the first market manage their earnings immediately in the year following a loss using debtors as the instrument for this purpose. Debtors capture revenue manipulation by early sales recognition and/or deflating bad debt expenses. The manipulation is mainly achieved through early recognition of sales and as a result the sales account in the next period is abnormally low. However, some companies did not manipulate after reporting a loss and as a result they reported a second loss. Eventually they did report profits and remained listed in the first market although the profits are not a result of accrual manipulation. Simulation tests show that the model of this research detects and measures earnings management better than the standard Jones model. The tests show that using a variable to measure discretionary accruals as an additional regressor in the model detects all the manipulation in comparison to residuals. These tests also provide additional evidence that the residuals are poor measures of discretionary accruals. The residuals become a good proxy for the discretionary accruals only if the manipulation is spread randomly across the sample. However, there is no reason to assume that manipulation is spread across the sample; it could be confined to a certain group of companies.

An important finding one can conclude from the previous research in earnings management is that there is no “best” model. Any approach or model has weaknesses as well as strengths, and any one of them can be used. But what is more important is the need to understand the accounting practices of the industry under examination. Researchers must familiarize themselves with the specific accruals that distinguish the sample to define the instruments that managers of that industry can use to manipulate earnings. For example, in intense fixed assets companies, working capital accruals are small and immaterial, so one would expect that manipulation might take place in accounts related to fixed assets, such as profits and losses when replacing an asset. On the other hand, in retailing companies the debtor’s turnover rate is less than three days because their sales are mostly in cash, so one might place more emphasis on the change in stock.

Earnings management is manipulating the accruals and the economic events; accruals can be manipulated by over/under estimating them, for example, through changes in allowances or accounting choices, whereas the economic events can be manipulated by deferring transactions and/or recognising other transaction prematurely. Based on that, researchers must allocate enough time and effort to carefully examine the business and accounting environment of the industry under examination.

Chapter Four

Pricing Discretionary Accruals in Amman Stock Market

4.1 Introduction:

In chapter two, the Jones model is extended to estimate discretionary accruals using an explicit variable rather than using the residuals. Chapter three provides evidence that companies listed in the first market are managing their earnings directly after reporting a loss. In this chapter, the results found in chapter three are extended. The purpose is to examine and determine whether the market attaches a value to and prices the discretionary accruals.

Net income is decomposed into three main components; cash flows from operations, nondiscretionary accruals, and discretionary accruals. Each component adds or contributes information relating to the economic value of the company. However, since discretionary accruals are an outcome of earnings management, then they should add no information about firms' performance. Furthermore, discretionary accruals might distort the value relevance and information content of the income figure. Additionally, net income can be presented in different forms using its components. Adding operating cash flows to nondiscretionary accruals gives nondiscretionary income, which is the net income before the manager manipulates earnings. Net income can also be expressed as nondiscretionary income plus discretionary accruals. This form shows the two parts of earnings that is classified according to managerial discretion and control.

The chapter's main objective is to examine the extent to which the market understands the different components of net income, and that net income can be expressed in different forms. If the market actually understands this, then they will treat discretionary accruals as empty information shells, even if they do not understand that they are a product of manipulation. On the other hand, if the market prices discretionary accruals, then it could suggest that the manipulation taking place in the first market is indeed misleading investors. This will also suggest that the market cannot differentiate between the components of net income.

Thus, if the market prices discretionary accruals, it indicates that the manipulation is successful on two levels; they remain listed in the first market, and they present an

optimistic image of the company's value. Moreover, pricing discretionary accruals will indicate the irrationality the market follows to price the components of net income. The discretionary accruals are only a result of manipulation and contain no information relevant to the true value of the company. Therefore, pricing the discretionary accruals for listed companies in the ASE is evidence of an inefficient market.

Results show that the market is pricing the discretionary accruals as a component of net income. The discretionary accruals are a result of earnings management for firms reversing to profits in order to remain listed in the first market. Results show that not only the market prices these discretionary accruals but also attaches a higher weight to them compared to nondiscretionary accruals and operating cash flow. This suggests that the market is overacting to discretionary accruals.

4.2 Literature review:

Dechow (1994) examines the importance of earnings as the summary measure of firm performance relative to realized cash flows (or net cash flow), which is an alternative performance measure. The paper argues that since realized cash flows suffer from timing and matching problems makes it less informative. Earnings however, are the product of the recognition and matching principles. These two principles give rise to accruals; hence, earnings through accruals mitigate timing and matching problems and are a better measure than realized cash flows.

Managers, through discretionary accruals, signal private information that can reduce the information asymmetry between the firm and other contracting parties which improves earnings to become a better measure. However, managers can also opportunistically manipulate accruals for private gains. As a result, to the extent earnings suffer from manipulation makes earnings less reliable as a performance measure, thus realized cash flows becomes a better measure. Accruals are required to be both objective and reliable to reduce the probability of managers providing false information, but by doing so, it could also reduce the usefulness of reported earnings in circumstances where management have private information. The usefulness of earnings will depend on this issue.

Dechow (1994) evaluates and compares the two performance measures against stock price performance, because it encompasses information in realized cash flows and earnings relating to firm performance:

The results of the paper shows that over short time intervals, earnings suffer less than realized cash flows from timing and matching problems and as the time interval increase differences between earnings and realized cash flows becomes smaller. An important issue here is as time interval increases, the contemporaneous association between stock prices and realized cash flows becomes stronger, but so will the contemporaneous association between stock price and earnings. Thus, earnings will be superior to cash flows over shorter and longer time intervals. The differences between

realized cash flows and earnings results from the level of credit sales and the level of cash collections from previous years credit sales.

Another important result Dechow (1994) documents is the larger the magnitude of total accruals in absolute value the lower the contemporaneous association between realized cash flows and stock returns, and the longer the operating cycle the lower the contemporaneous association between realized cash flows and stock price performance. Since earnings is a superior measure to cash flows over short and long periods, the paper further investigates the reason of this superiority, and finds that accruals are the underlying reason. Operating accruals are decomposed into change in working capital accruals and long term operating accruals. Results show that as the absolute value of long term accruals increase there is no decline in the association between stock returns and cash flow from operations. However, as the absolute magnitude of working capital accruals increase the association between cash flow from operations and stocks returns declines. This result shows that long term operating accruals play a less important role in mitigating timing and matching problems relative to working capital accruals.

Subramanyam (1996) investigates the pricing of discretionary accruals by the market. Accruals are decomposed into nondiscretionary and discretionary accruals using cross-sectional versions of the Jones and modified Jones models.

Univariate regressions are conducted to determine which of the performance measures explain stock returns the most. Three univariate regressions of returns on earnings and earnings components are carried out; earnings are decomposed into cash flows from operations, nondiscretionary earnings and discretionary earnings. This test is to assess the relative information content of the three measures (firm and time subscripts are omitted for convenience):

If accruals are increasing value relevance then by moving from operating cash flows to net income should increase the explanatory power of the model. However, if discretionary accruals are noise then no increase should be observed when moving from

nondiscretionary income to net income. Results show that nondiscretionary income is more value relevant than operating cash flows but less value relevant than net income, this confirms that both discretionary and nondiscretionary accruals contributes value relevance to earnings. The three models are assessed in terms of the increase in explanatory power and in the coefficients values.

Subramanyam (1996) also examines the incremental information content of the discretionary and nondiscretionary components of earnings by regressing stock returns on earnings' components in multivariate models. This test examines the incremental information content of net income components; also it shows the weight attached to each component (firm and time subscripts are omitted for convenience):

Where CFO is operating cash flows, TA is total accruals, NDA is nondiscretionary accruals, NDNI is nondiscretionary income, and DA is discretionary accruals.

Results indicate that nondiscretionary accruals have incremental information content over operating cash flow, and discretionary accruals have incremental explanatory power over nondiscretionary income. Subramanyam (1996) conducts further tests to discriminate between whether the pricing of discretionary accruals is due to market efficiency and therefore prices discretionary accruals because it improves the ability of earnings to reflect firm performance, or whether discretionary accruals distort earnings because of earnings management. The results support the first explanation that discretionary accruals are improving the earnings persistence and predictability through income smoothing.

Sloan (1996) examines the nature of the information contained in accruals and cash flows as the two components of earnings, and how this information is reflected in stock prices. The main argument of the paper is to determine if the market fully incorporates available information in the stock price.

The reasoning of the underlying argument of Sloan (1996) is that the accrual and cash flow components of current earnings have different implications to evaluate future earnings. In other words, current earnings performance is less likely to persist when it is attributable to the accrual component of earnings, while current earnings are more likely to persist if they are attributable to the cash flow component of earnings. The paper tests this by applying the following model:

Sloan (1996) employs a naïve earnings expectations model to test the efficiency of the market, and argues that investors fixate on earnings and fail to distinguish between the two components of earnings. The paper assumes if investors fixate on earnings, then they will tend to *overprice* stocks when the accrual component is *higher* than the cash flow component, and vice versa. This mispricing is because the accrual component is not fully anticipated by the market. To exploit this mispricing, the paper implements a trading strategy taking a long position in stocks of firms with low levels of accruals and a short position in stocks of firms with high levels of accruals to generate abnormal stock returns. Results indicates that earnings performance attributable to the accrual component shows lower persistence than earnings performance attributable to the cash flow component, and that investors fail to distinguish fully between the two components of earnings. Furthermore, the study finds that firms with relatively high levels of accruals experience negative future abnormal returns that are concentrated around future earnings announcements. The opposite is also true, firms with low levels experience positive future abnormal returns. The results of this paper are inconsistent with the efficient market view that all publicly available information is incorporated in stock prices.

Collins and Hribar (2000) compares two prominent accounting based market anomalies, the post earnings announcement drift and the accrual anomaly, to determine whether they capture the same market inefficiency or whether they represent different anomalies. If the latter is the case, then both anomalies reveal more market mispricing than has been documented.

The post earnings announcement drift literature suggests that the market under reacts to earnings surprises. On the other hand, the accrual anomaly suggests that the market overreacts to earnings that contain large accruals component for both extreme negative

and positive accruals. Results show that abnormal returns are associated with both a quarterly accruals strategy and an unexpected earnings-based strategy, and both strategies appear to capture different types of mispricing. Additionally, results show that by combining both strategies, abnormal returns increases significantly with no additional risk in terms of magnitude or frequency of loss. Moreover, the study shows that the drift is substantially greater when the level of accruals is in the opposite direction of earnings surprises. Conversely, the drift mitigates or disappears all together if the accruals are in same direction as the earnings surprises.

Xie (2001) examines the mispricing of abnormal accruals in general conditions regardless whether the abnormality results from earnings management or not. The paper uses two methods to test the rational pricing of abnormal accruals with respect to their one-year-ahead earnings implications.

The first method is the Mishkin test to compare statistically the valuation coefficient with the forecasting coefficient of the abnormal accruals. The decision rule of this test is if the valuation coefficient is larger (smaller) than the forecasting coefficient then the market overprices (under prices) the abnormal accruals, and by using the forecasting coefficient, the author measures the persistence of abnormal accruals. The second method is the hedge-portfolio test to form a portfolio long in firms in the most negative decile and short in firms in the most positive decile of current abnormal accruals.

The results of both tests provide evidence that the market overprices abnormal accruals relative to their association with one-year-ahead earnings, but does not materially misprice normal accruals. An important issue this paper addresses is the error captured along with managerial discretion in the Jones model, and by conducting sensitivity analysis, the paper controls for major unusual accruals and non-articulation events to reduce the error in the discretionary accruals measure.

DeFond and Park (2001) investigate the role of accruals in pricing securities by testing whether the market's pricing of earnings surprises anticipates the reversing implications of abnormal accruals. The study argues that the reversing of abnormal accruals should be priced differentially by the market since they will have little or no effect on life time earnings.

DeFond & Park (2001) expects the reported magnitude of earnings surprises, that contain abnormal accruals, to differ from the underlying magnitude that the market prices. This is because the market perception of the earnings surprises depends on the effect of abnormal accruals and the sign of earnings surprises.

Income increasing abnormal accruals exaggerate the magnitude of good news earnings (positive surprise) and the market infers that the underlying surprise is actually *smaller* than reported. Additionally, income decreasing abnormal accruals suppresses the magnitude of good news earnings surprise, and therefore the market infers that the underlying surprise is *larger* than reported. This is tested by examining the size of the earnings response coefficients (ERCs) for good news firms with income-increasing abnormal accruals and income-decreasing abnormal accruals. On the other hand, the market prices firms suppressing the magnitude of bad news earnings (negative surprises) higher than firms exaggerating the magnitude of bad news through income decreasing abnormal accruals. Thus, the ERCs for firms suppressing negative surprises through income-increasing abnormal accruals should be smaller than for firms exaggerating negative surprises.

Results are consistent with the paper's predictions; the ERC is significantly larger for good news firms reporting income-decreasing abnormal accruals than for firms reporting income-increasing abnormal accruals. As for bad news firms, the ERC is significantly higher for firms reporting income-increasing abnormal accruals than for firms reporting income-decreasing abnormal accruals. Evidence show that, to a limited degree, the market anticipates the reversing implications of abnormal accruals, which is consistent with prior evidence that the market does not fully adjust for other implications of accruals based earnings. DeFond & Park (2001) concludes that market participants (at least) partially adjust for suspected earnings management, if the abnormal accruals reflect intentional misstatements.

Thomas and Zhang (2002) build on the results found in Sloan (1996). The paper aims to identify the components of the accrual measure used by Sloan (1996) that explains the market inefficiency. The paper finds that changes in stock levels (inventory) exhibit a consistent and substantial relation with future returns, and tries to explain the link between stock changes and abnormal returns.

Thomas & Zhang (2002) finds firms with stock increases (decreases) have higher (lower) profitability, growth and returns over the past five years, but these trends reverse after extreme changes in the stock levels. Moreover, firms with stock increases (decreases) experience stock decreases (increases) in the past year although profitability increases (decreases) in both years.

Additionally, results show that the observed abnormal returns following the changes in stock are concentrated at subsequent quarterly earnings announcements and are related to predictable earnings surprises reported at those announcements. Thomas & Zhang (2002) decomposes stock into its components (raw material, finished goods and work in process) and finds a higher relation between abnormal returns and changes in raw material stock.

Thomas & Zhang (2002) main conclusion is both profitability reversal and stock changes are caused by demand shifts. The paper suggests two main reasons for the masking of profitability shift through contemporaneous reported profitability; one reason is due to earnings manipulation through misstating stock balances.

Beneish and Vargus (2002) investigate the information content of insider trading about earnings quality. The paper examines whether firm-periods in which the direction of the accruals contradicts the direction of the insider trading have lower earnings quality.

Additionally, Beneish & Vargus (2002) examines whether firm-periods have higher earnings quality if the direction of the accruals confirms the direction of the insider trading. Finally, the paper investigates if the market misprices high vs. low quality accruals. The paper also looks for a link between low earnings quality and earnings management.

Results show that income increasing accruals are significantly more persistent for firms with abnormal insider buying and significantly less persistent for firms with abnormal insider selling, relative to firms with no abnormal insider trading. This suggests that insider trading information is useful in *ex ante* identifying high or low quality for income-increasing accrual firms.

Pricing tests reveal that the accrual mispricing is mostly due to the mispricing of income-increasing accruals, where they appear to be overpriced when managers engage in abnormal selling or do not trade at all. On the other hand, they are rationally priced

when managers engage in abnormal buying. Overall, the market prices all income increasing accruals believing they are of high quality.

Finally, Beneish & Vargus (2002) shows that the lower persistence of income increasing accruals accompanied by abnormal insider selling is partly attributable to earnings management, other explanations could rise from economic changes surrounding the firm, making accruals less informative about one year ahead earnings.

Collins et al. (2003) examines the role of investor sophistication in assessing the valuation implications of accruals. The paper is based on the extended functional fixation hypothesis (EFFH) which states that a firm's stock is sometimes set by marginal investors who are relatively sophisticated in their interpretation of accounting data, while other times prices are set by unsophisticated marginal investors who are less knowledgeable about the properties of accounting data.

Based on that, there is a greater likelihood of mispricing a security when an earnings signal comprised of accruals and cash flows is intercepted by an unsophisticated investor. Likewise, mispricing is less if a sophisticated investor sets the prices.

Collins et al. (2003) uses institutional investors as a proxy for sophisticated investors, because they have greater resources and knowledge for gathering and interpreting information contained in the financial reports, especially when compared to individual investors. Consistent with previous research, the paper uses the Mishkin test and the hedge portfolio test to examine the mispricing anomaly.

Results from both tests show that the degree of accrual mispricing is substantially less for firms with high institutional ownership relative to firms with low institutional ownership. Furthermore, the accrual based hedge portfolio tests show that the one-year-ahead hedge returns are significantly smaller for firms with high institutional ownership relative to low institutional ownership. However, the hedge returns for high institutional ownership firms are still significant and positive, which suggests the existence of some mispricing, even in the presence of sophisticated investors.

Desai et al. (2004) investigates the relation between the value glamour anomaly documented in the finance literature and the accruals anomaly documented in the accounting literature. The paper aims at presenting simple explanations of the two

anomalies because they appear to be associated with the market's inability to process related accounting information.

Desai et al. (2004) documents an association between accruals and future returns after controlling for four proxies for value glamour: past sales growth, book to market, earnings to price and cash flow to price. However, the paper uses a different measure of operating cash flows in the cash flow to price ratio than the one used in past finance literature.

Cash flow from operations is measured in finance literature as earnings plus depreciation and thereby assumes that deprecation is the only significant accrual that needs to be added back. This measurement ignores working capital accruals because the paper considers it to be an incorrect measure. Alternatively, operating cash flows are measured as earnings plus depreciation minus working capital accruals, and create a new variable labelled operating cash flow to price. Desai et al. (2004) assumes that this new variable is more powerful and comprehensive and subsumes the mispricing attributed to all other value glamour proxies related to future returns.

The results support the notion that the accruals mispricing is in fact the value glamour anomaly. In other words, the accrual anomaly and the value glamour anomaly are two sides for the same coin. But this interpretation differs according to the measure of operating cash flows in the operating cash flow to price ratio. If operating cash flows are measured as earnings plus depreciation (as measured in finance literature), then the results will suggest that both anomalies captures different sources of mispricing. On the other hand, if operating cash flows are measured as in this paper, then results will support the interpretation that both anomalies are in fact the same anomaly.

Callen and Segal (2004) investigate the relative impact of accrual news, cash flow news and expected-return news on unexpected changes in current period stock returns. The focus on changes rather than levels is to form an understanding of the relative importance of the three factors in driving current stock returns.

Callen & Segal (2004) looks into expected return news (i.e. expected future discount rates) because it affects changes of equity returns, similar to the affect caused by accruals and cash flows. The study analyse the value relevance of accruals to determine the effect, if any, of the expected accruals reversal on current stock returns, and to

determine the proportion of total variance in current unexpected returns that can be explained by accruals news relative to other factors. Additionally, the paper develops a variance decomposition framework to include accruals by incorporating the Feltham-Ohlson clean surplus model to compute the relative impact of accruals news and expected returns news on unexpected changes in current returns.

Results from the Feltham-Ohlson model highlight the importance of accruals news and dominates expected-return news in driving stock returns. Furthermore, operating income news significantly dominates both expected-return news and free cash flow news in driving returns. Results also reveal that both accrual earnings news and cash flow earnings news are equally significant drivers of stock returns. However, when disaggregating the variance decomposition by control variables (e.g. firm size), results show that accruals earnings news is a more important factor than cash flow earnings news in driving current returns.

Richardson et al. (2005) investigates the relation between accrual reliability and earnings persistence. The paper builds on the evidence found in Sloan (1996) that the accrual component is less persistent than the cash flow component and attributes this difference to the greater subjectivity of accruals. The paper draws a link between Sloan's (1996) notion of subjectivity and the accounting concept of reliability.

Richardson et al. (2005) models the implications of reliability for earnings persistence to predict whether less reliable accruals result in lower earnings persistence. Empirical tests employ a comprehensive categorization of accounting accruals in which each accrual category is rated according to its reliability.

Results show that less reliable accruals lead to lower earnings persistence, and stock prices act as if investors do not anticipate the lower persistence of less reliable accruals which results in significant security mispricing. Overall, the results suggest that there are significant costs associated with incorporating less reliable accrual information in financial statements.

Core et al. (2006) examines the manager's trading decisions correlation with trading strategies suggested by the operating accruals and the post-earnings announcement drift (SUE) anomalies. Managers are in the best position to observe pricing deviations from fundamental value, because of the role they play in the financial reporting process.

Investor's inability to recognise the differential persistence of accruals and cash flows gives rise to the accrual anomaly. On the other hand, managers (as insiders) have the advantage of better understanding the firm's accrual process.

Core et al. (2006) is based on empirical evidence that shows managers are well informed about their firm's future expected cash flows and the cost of capital, and by using this information they make decisions about share repurchase and individual trading. The main focus of this paper is the correlation between the information managers uses to generate abnormal returns and the anomalous public information used to form trading strategies according to the accruals and SUE anomalies.

Results show corroborative evidence for the accruals anomaly; repurchase and insider trading behaviour of managers' varies consistently with the information underlying trading strategy. Particularly, low (high) accruals firms repurchase more (less) shares, and managers of low (high) accruals firms buy more (less) shares on their personal accounts. However, the study did not find any evidence for the SUE anomaly.

Chan et al. (2006) examines the level of earnings quality as a predictive measure for future movements in stock prices. Earnings quality is affected by the level of accruals, thus the paper explores several hypotheses to explain the association between accruals and subsequent stock returns. Managerial manipulation gives rise to accruals and since the market is fixated on the bottom line income, investors can be fooled. On the other hand, high accruals could be a result of past high growth in sales, and managers build up stock and other working capital items. As a consequence, the market overprices firms with high accruals estimating (overoptimistically) future growth rates. Another explanation the paper explores is the slow reaction to the information content of accruals, which results in a subsequent negative stock prices reaction.

Chan et al. (2006) findings show that accruals are related negatively to future returns. Furthermore, by examining the time series behaviour of accruals and operating performance for high accrual firms, the paper documents evidence of earnings management. Additionally, they find that the nondiscretionary accruals do not predict future stock returns, a similar result found in Xie (2001). This result is not consistent with the hypothesis of market overpricing firms with past future sales growth. Therefore, the discretionary accruals are the main contributor to the predictability of stock returns.

Furthermore, Chan et al. (2006) document that accruals are the leading indicator of the firm's performance, in the absence of manipulation, and the market tends to under react to these indicators. To provide robustness to the results, the paper compares homogenous sets of firms within an industry, and finds the higher the accruals, the lower the returns. A similar result is obtained from UK stocks as well.

Mashruwala et al. (2006) examines the barriers that prevent arbitrageurs from taking trading positions to eliminate the effect of accruals mispricing. The paper examines two explanations; the first is the lack of similar substitutes. These substitutes' shares have returns that are highly correlated with returns of shares that are subject to accruals mispricing. The second explanation is whether shares suffering from the accrual anomaly have higher transaction costs.

Mashruwala et al. (2006) uses idiosyncratic portion of a stock's volatility that cannot be limited by holding offsetting positions in other stocks and indexes as a proxy for the absence of similar or close substitutes. Results show that future abnormal returns stemming from accrual based trading positions are higher in stocks that lack close substitutes (using stocks with higher idiosyncratic volatility). Furthermore, the study finds that higher returns from the accrual spread portfolios are found in stocks with lower stock prices and lower trading volume. Therefore, transaction costs places further limitations on arbitrage. The paper does not impose a different interpretation to the findings of Sloan (1996) and Xie (2001), that the market is actually fooled by accrual manipulation; it however, suggests that even if the market understands the consequences of manipulating accruals on future earnings, abolishing the mispricing will be very difficult.

Lev and Nissim (2006) examines the timeliness and the magnitude of institutional investors' reaction to accruals information using quarterly institutional ownership data compared with monthly returns patterns. The paper distinguishes between institutions that trade frequently in an attempt to profit from short term price changes (transient institutions) and all other institutions (non-transient institutions), in order to determine whether institutional trading lead or lag the accruals related price changes.

Evidence shows a negative relation between the level of accruals in a given year and the change in ownership transient institution held during the last quarter of that year, as well as in each of the subsequent three quarters. Therefore, transient institutions investment's

is related to accruals information, a portion by quarterly reports information and the rest by annual accrual information. Additionally, when comparing the intensity of accruals related investment between two periods (i.e. between the 1980's and 1990's); results show that transient institutions, over time, enhance the sophistication of their trading on accruals information. On the other hand, non-transient institutions accruals related investments is not existent in the 1980's and concentrated in the first quarter of the following year during the 1990's. Furthermore, Lev & Nissim (2006) documents an actively and expeditiously trade by institutions on the information in accruals, rather than a reaction to the subsequent stock price changes as documented by Sloan (1996). The paper concludes that arbitraging away the accruals anomaly is hindered by various structural and cost factors, which are unlikely to fade away in the near future.

Dechow and Ge (2006) argues that the applicable accounting rules reflected in accruals differ for firms increasing or reducing their asset basis and that this has implications for earnings persistence. They use this argument to examine the accrual anomaly documented by Sloan (1996). Basically, the paper investigates the implications of balance sheet adjustments relating to special items to explain the accrual anomaly.

Dechow & Ge (2006) finds that low accrual firms with large negative special items consistently earn higher positive returns than other low accrual firms. Moreover, when splitting the lowest decile of accruals into those firms reporting special items and those that are not, the study finds that *special-item* firms earn a size adjusted return of 11.7% over the following year. On the other hand, firms with no special items earn a size adjusted return of only 1.4%. The paper also finds that over 11 of the 15 years examined, *special-item* firms with low accruals outperform other low accrual firms.

Overall, Dechow & Ge (2006) main findings suggest that firms recording special items help to identify the end of the negative price momentum cycle. These firms have performed poorly and the recording of special items is an indicative of management taking action to turn the firm's performance around. As a consequence, investors overweight the probability that the firm will be unsuccessful. Although *special-item* firms with low accruals end up turning themselves around at higher rates than expected, accompanied with improved stock price performance.

Kraft et al. (2006) aims at highlighting and quantifying the impact of robustness tests on causal inference drawn from trading strategies based on accrual related information. The

paper argues that robustness tests are not typically performed in prior papers on the accrual anomaly.

Kraft et al. (2006) also argues that researchers should be careful about deleting observations that result from unusual events or errors when testing a trading strategy. This could lead to biased measures of portfolio return performance and incorrect inference about market efficiency.

Kraft et al. (2006) tests the robustness of the results in the accrual mispricing literature by using the least trimmed squares (LTS) procedure and also by using standard robustness tests that are commonly applied in the accounting literature. Both tests produce similar results. The paper performs additional robustness tests by excluding a small number of firm-year observations, and finds that there is a U-shape relation between buy-and-hold abnormal returns and total accruals. This U-shape relation is inconsistent with the functional fixation hypothesis found in Sloan's (1996) study as well as in other accrual anomaly studies.

Kraft et al. (2006) concludes, based on these results, that the accrual anomaly is unlikely to be investors' inability to process accounting information, as suggested by the functional fixation hypothesis.

Pincus et al. (2007) examines the accrual anomaly across 20 countries and whether its occurrence is associated with country level accounting and institutions structures. The study conducts the Mishkin test to document the mispricing of accruals outside the U.S and according to legal tradition (i.e. common law vs. code law). The study also uses country level data to test a set of conjectures relating the mispricing of accruals to cross-country differences in accounting and institutional structures. Countries are categorised according to three characteristics: legal tradition and the extent of constraint on insider trading; extent of accrual accounting permitted and the strength of shareholders protections to mitigate earnings management; characteristics of equity markets.

Results show that the accrual anomaly is more likely to occur in common law legal tradition countries and where more extensive use of accrual accounting is permitted. Additionally, the accrual anomaly occurs more in countries where there is lower concentration of share ownership and where there are weaker outside shareholders rights. Furthermore, results suggest that the accrual anomaly is due to the use of

accruals to manage earnings. The reason it persists is because the absence of close substitutes for mispriced stocks, which imposes a barrier to arbitrage.

Zhang (2007) investigates the accruals ability to capture fundamental investment and growth in working capital. The paper examines different implications of persistence and investment in the context of the accrual anomaly. In other words, the paper provides an in-depth understanding of the underlying cause of the accrual anomaly by examining cross-sectional variation in the anomaly based on a firm's business model.

Zhang (2007) focuses on the different information content of accruals across industries/firms to generate different cross-sectional implications based on two competing views: the investment view and the persistence view. A key difference in the paper's approach from previous research is examining employee growth, which is not an accounting variable, thus it is not related to the accounting based persistence argument.

Under the investment view, accruals capture fundamental investment in working capital accruals, which co-varies with employee growth as well as other growth attributes. On the other hand, the persistence argument views accruals as a component of earnings and are less persistent than cash flows and therefore investors misestimate accruals persistence.

Zhang (2007) provides empirical evidence supporting the investment argument. In other words, the accrual anomaly varies across industries/firms in a predictable way based on the co-variation between accruals and employee growth. Hence, when accruals co-vary highly with employee growth, accruals can predict future stock returns. Conversely, when the accruals do not co-vary with employee growth, the accrual anomaly is weaker. On the other hand, the results do not support the persistence argument and shows that the magnitude of the accrual anomaly increases with the persistence of accrual relative to cash flows. Therefore, these results support the notion that the accrual anomaly is mostly attributable to the fundamental investment information contained in accruals rather than to the lower persistence of accruals relative to cash flows.

Kraft et al. (2007) illustrates how the omitted variables problem affects inference drawn from the Mishkin test in accounting settings, which probably leads to incorrect inference about the mispricing of accruals documented in past literature. The paper

compares results obtained from the Mishkin test to those obtained from applying conventional regression tests (i.e. OLS).

Kraft et al. (2007) argues that although the Mishkin test has been used widely in accounting literature, certain aspects of the test appear to be not understood completely by accounting researchers, and thus incorrect inferences has been drawn in prior research. One aspect of the Mishkin test that has been misunderstood is whether or not omitting variables from the forecasting equation biases test of market efficiency.

Kraft et al. (2007) shows that the coefficients of the Mishkin test's forecasting and pricing equations are sensitive to the exclusion of other explanatory variables. In other words, the paper shows how the accrual anomaly disappears by adding additional explanatory variables to the forecasting model in the Mishkin test. The paper recommends accounting researchers to demonstrate explicitly the advantages of using the Mishkin test over OLS in their research settings, or otherwise they should simply use the OLS. The paper favours using OLS over the Mishkin test in accounting research, especially in market efficiency tests (e.g. pricing accruals rationally). This is because of the several advantages of the OLS over the Mishkin test, such as the ease of implementation and straightforwardness of including additional explanatory variables, also because the OLS is better understood.

Khan (2008) suggests that mispricing low and high accrual stocks can be explained mostly by risk. The paper uses a four factor model motivated by the intertemporal capital asset pricing model (ICAPM) to measure the risk factors causing the accrual anomaly.

Khan (2008) also uses a two-pass cross sectional regression methodology that produces a statistic test to check whether the aggregate pricing error generated by the four factor model is different from zero. Moreover, the paper conducts several tests to examine whether hedge portfolios can be formed to exploit any individual pricing errors in the extreme accrual portfolios. Results show that a considerable portion of the cross-sectional variation in average returns to high and low accrual firms is due to risk. Additionally, results from examining the economic and financial characteristics of accrual portfolios provide additional evidence for a risk based explanation for the accrual anomaly. The paper's bottom line conclusion is firms with high low accruals

causes' cross-sectional variation in returns due to higher risk in these firms, but not due to the market's misunderstanding the abnormal accrual effect on earnings.

4.3 Hypothesis Development:

This chapter is based on the results presented in the previous chapter. The Jones model is extended to include an additional variable to represent the discretionary accruals instead of the residuals. The results shows that companies listed in the first market manipulate their earnings directly in the period following a loss year.

The purpose of this chapter is to extend the results reported in the previous chapter to examine whether the market prices discretionary accruals. If that is the case, then the market is not seeing through the manipulation and is therefore pricing discretionary accruals as a component of earnings. In other words, the market is misled by the manipulation of earnings. On the other hand, if the discretionary accruals are not priced, then it could mean that the market attaches no weight or disregards the discretionary accruals. As a result, the market does actually see through the manipulation and understands that it is not a component of reported earnings and represents only management's own discretion. If this is the case, then the market rationally prices the components of earnings.

The approach applied here is similar to the one used by Subramanyam (1996), which is regressing stock returns on earnings and its components. The only difference here is using stock prices as the dependent variable instead of stock returns. Price models are better than return models because they reject more frequently tests for heteroskedasticity and model misspecification (Kothari & Zimmerman, 1995). Moreover, price models are sufficient to identify and incorporate the effect of historical and current accounting information (Darnell & Skerratt, 1989). Therefore, stock prices at end of the third month of the fiscal year are regressed on earnings and its components. By this time all firms' financial statements and related information are publicly available and will be incorporated in stock prices. Following Subramanyam (1996), the tests are designed to evaluate which component of earnings has the most incremental information content. Earnings are decomposed into operating cash flows, nondiscretionary accruals and discretionary accruals. Each component is priced by the market according to its information content. Thus, each component contributes in explaining the variation in stock prices in different weights.

Two sets of analysis are carried out; the first set is running univariate analysis by using three alternative firm performance measures to assess the relative information content of each measure: operating cash flows, nondiscretionary income and net income. The first model is regressing stock prices on operating cash flows, then in second model stock prices are regressed on nondiscretionary income and finally stock prices are regressed on net income in the third model. The purpose of this analysis is to examine the incremental information of each measure of firm performance. If the market sees through the manipulation, then there will be no difference between net income and nondiscretionary income (nondiscretionary income= operating cash flows + nondiscretionary accruals). That is, if discretionary accruals are noise then no increase will be observed when moving from nondiscretionary income to net income. The explanatory power of net income will be higher if the market prices discretionary accruals as a component of earnings, which leads to irrational pricing. The second set of analysis is running multivariate analysis by regressing prices on different components of net income. Basically, there are three components of earnings, which are used to form four multivariate models. This analysis provides an examination of the incremental information continent of the components of net income on how the market attaches a weight to each component. Therefore, if the market does not price discretionary accruals then the explanatory power of nondiscretionary accruals will be the highest and it will explain the variation in stock prices the most. Subramanyam (1996) assumes that the market is efficient in the sense that the investors behave towards discretionary accruals as manager's private information signalled through net income. However, the assumption here is the same as in the previous chapter, which is considering discretionary accruals as managers' effort to manipulate reported earnings to achieve specific goals (i.e. remain listed in the first market). Therefore, this chapter does not examine market efficiency directly, but if the discretionary accruals are not priced then a conclusion of market efficiency can be drawn.

The models in both sets of the analysis are set up to compete as non-nested models to examine which model is favourable (better) in explaining stock prices (Subramanyam, 1996; Dechow, 1994). In past literature, papers implemented the Mishkin test to examine if the market rationally prices the accounting numbers. Sloan (1996) documents investors' failure to fully reflect information in the accrual component and cash flow component of earnings. The tests used in Sloan (1996) and in Xie (2001)

focus more on the issue of market efficiency. However, the ordinary least squares (OLS) method is better understood and easier to implement in accounting settings than the Mishkin Test. Moreover, in (OLS) it is easier to include additional explanatory variables. The main problem with the Mishkin is the omitted variables problem, which is the case when excluding variables from the Mishkin test forecasting and pricing equations. This affects the inference drawn from the test in accounting settings (Kraft et al., 2007). For non-nested model selection, the J-test suggested by Davidson and MacKinnon (1981) can be used to compare between two models. The problem with this test is it might lead to accept or reject both models. Moreover, the test lacks power in small samples and it tends to reject the null hypothesise, that either model is true, more frequently. An alternative test is the likelihood ratio test suggested by Vuong (1989). This test is more powerful because it can reject one model in favour of another in circumstances where the J-test cannot (Dechow, 1994). Therefore, the competing models are compared to each other firstly using general goodness-of-fit criteria such as the R^2 or adjusted R^2 and Akaike's information criterion (AIC). These criterions do not provide statistical tests of hypothesis; therefore the models are compared using the Vuong test to indicate which model is better in explaining the variation in the stock prices. Another important issue this chapter considers is the scaling issue. Accounting variables are usually scaled using total assets (in period *t* or period *t-1*), stock prices and market value. The scaling is used to reduce heteroskedasticity. The problem with this issue is that it follows the researcher's judgment in choosing the correct deflator, and the choice of the deflator is a source of potential misspecification (Christie, 1987). In previous return studies, the left hand side is deflated with stock prices in period t-1, while the right hand side is deflated using a different variable (e.g. total assets), thus the "*equation*" is deflated with two different variables. Therefore, and since the models are basically regression equations, then both sides of the equation should have the same deflator. The correct deflator for return models and price models is the market value of equity (Easton & Sommers, 2003; Christie, 1987).

4.4 Measurement of variables[4]:

Since price models are equivalent to return models for reasons mentioned in section 4.3, stock prices reported at the end of March of the fiscal year are multiplied with number

[4] All variables are taken from the financial statements of the companies, same as in chapter 3. Financial statements are available for free download from the Amman Stock Exchange website: www.ase.com.jo

of shares issued as they appear in the financial statements at the end of March, to compute market capitalization or market value of equity:

(eq. 4.1)

Prices at the end of March will contain all available accounting data, since the fiscal year for all listed companies in the ASE ends by December. The nondiscretionary accruals and discretionary accruals are estimated using the model developed in the previous chapter. The total accruals are computed as the difference between earnings before taxes and operating cash flows:

(eq. 4.2)

Total accruals are decomposed into nondiscretionary accruals and discretionary accruals:

(eq. 4.3)

Nondiscretionary accruals and discretionary accruals are estimated using the extended Jones model developed in chapter two:

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta DRS_{it}}{A_{t-1}}) + \varepsilon_{it}$$

Where:

TA_{it}: total accruals for firm i in year t.
ΔREV_{it}: change in sales revenue for firm i in year t.
PPE_{it}: property plant and equipment for firm i in year t.
ΔDRS_{it}: change in net debtors for firm i in year t.
D: dummy variable that equals 1 if the company reports a loss in the previous year, 0 otherwise.
A_{t-1}: total assets for firm i in year t, is the scale variable to reduce heteroskedasticity.

The analysis in this study is based on the explanatory power of each level of earnings to examine whether the market rationally prices the various components of earnings. Therefore, net income measured as net income before taxes, is decomposed as the following (firm and time subscripts are omitted for convenience):

(eq. 4.4)

Where *NI* is net income before taxes and *CFO* is operating cash flows and *TA* is total accruals. Since total accruals can be decomposed into nondiscretionary and discretionary accruals, net income is expressed as:

(eq. 4.5)

NDA is the nondiscretionary accruals and are estimated as the following:

(eq. 4.6)

DA is discretionary accruals and is estimated as the product of the change in debtors and the dummy variable that represents the incentive:

(eq. 4.7)

Nondiscretionary income is computed as:

(eq. 4.8)

Therefore, if the market does not attach a value to discretionary accruals, i.e. does not price *DA* because they see through the manipulation, then *DA* and its coefficient will equal zero, and there will be no difference in the explanatory power between the nondiscretionary income model and the net income model:

(eq. 4.9)

(eq. 4.10)

To summarise, there are three components of earnings that each contributes differently in explaining the variation in stock prices. Furthermore, there are three alternative firms' performance measures:

First measure: (eq. 4.11)

Second measure: (eq. 4.12)

Third measure: (eq. 4.13)

The analysis will be based on the components of net income and the three measures of performance. Overall, there are three estimated models to compete as non-nested

models in the univariate analysis, and four models in the multivariate analysis. Models are favoured based on the Vuong test.

4.5 Hypothesis formulation:

Companies listed in the first market in the Amman Stock Exchange are motivated to report profits and avoid reporting losses. If a company report losses for three consecutive years it will be removed from the first market and re-listed in the second market. Therefore, companies will manipulate their earnings to report profits. Results from the previous chapter reveal that manipulation takes places in the period following a loss year immediately.

The purpose of this chapter is to determine whether the market understands this motive, and considers the manipulation as the outcome of companies' effort to remain listed in the first market. The market in this case will only attach a value to or price the components of earnings that contain information relating to the firm's ability to generate cash flows in the future. Hence, the market will exclude discretionary accruals component from earnings and will not price them at all. Thus, the main hypothesis to be tested in this study is:

H_0: The market understands the manipulation and as result does not attach value to or price discretionary accruals.

The tests applied in this chapter are similar to the tests used in Subramanyam (1996). The first set of tests is running univariate analysis, the market value of stocks are regressed on operating cash flows, then on nondiscretionary income, and finally on net income. The explanatory power of each model is examined to determine which of the three performance measures explain the most of the variation in stock prices. Therefore, there will be three univariate models:

Model 1: ——— ——— ———

Model 2: ——— ——— ———

Model 3: ——— ——— ———

Where

MV_{it}: is market value for firm *i* in year *t*, and is the product of multiplying share price with number of issued shares.

CFO_{it}: operating cash flows for firm *i* in year *t*.

$NDIN_{it}$: nondiscretionary income for firm *i* in year *t*, and is the sum of operating cash flows and nondiscretionary accruals.

NI_{it}: net income (earnings) before taxes for firm *i* in year *t*.

Mv_{it-1}: market value from period *t-1*, and is the deflator (scale) variable to reduce heteroskedasticity.

The explanatory power (i.e. R^2) and the slope coefficients of these univariate models are compared in order to examine the information content of each level of earnings. If the nondiscretionary income contains more information through nondiscretionary accruals, then the slope coefficient and the explanatory power nondiscretionary income will be higher than operating cash flows. Moreover, if the market prices discretionary accruals the slope coefficient and the explanatory power of net income will be the highest. However, if the market does not price discretionary accruals, then there should be no difference between net income and nondiscretionary income, and both slope coefficients should be equal.

The second set of tests is running a multivariate analysis to examine the incremental information content of operating cash flows, nondiscretionary accruals and discretionary accruals, which are the components of net income. Four models are applied as multivariate models; in each model market value is regressed on different components of net income. In other words, net income is expressed differently in each model according to the components:

Model 4: ——— ——— ——— ———

Model 5: ——— ——— ——— ———

Model 6: ——— ——— ——— ———

Model 7: ——— ——— ——— ——— ———

Where;

NDA_{it}: nondiscretionary accruals for firm i in year t.
DA_{it}: discretionary accruals for firm i in year t.
TA_{it}: total accruals for firm i in year t.

The slope coefficients of each variable in the same model are compared to each other to examine which component of earnings is priced the highest. This examination will indicate which component has the highest incremental information content and the value weight attached to each component.

If the market does not price discretionary accruals, then model 7 will be the same as model 5. The purpose of running model 4 is to examine whether the market overprices total accruals in comparison with operating cash flows. If the market does not price discretionary accruals then model 4 will be the same as model 5 and model 7.

The models from both sets of analysis are set up as competing non-nested models. These models are compared based on two criteria; the adjusted R^2 and AIC (Akaike's Information Criterion) but comparing based on these two criteria does not provide a statistic test of the hypothesis. Therefore, the models are compared based on Vuong's likelihood ratio test (Vuong, 1989). The null hypothesis tested using Vuong's test for each comparison is two models are equally close to explaining the variation in stock prices, if the null is rejected then the alternative hypothesis that one model is better than the other is accepted.

4.6 Sample and data:

In the previous chapter, data is collected from a sample of 36 companies from the industrial sector from the period 2002 to 2006. Data is arranged based on a cross section format producing 180 firm-year observations. All variables are taken directly from the financial statements downloaded from the Amman Stock Exchange website.

The same data is used in this chapter to build on the results found in the previous chapter. Stock prices at the end of March are multiplied with the number of outstanding shares to compute the market value of equity. The price taken at the end of March allows for all available accounting data to be incorporated, since the fiscal year ends in December for all firms in the sample.

4.7 Descriptive statistics:

Table 4.1 provides descriptive statistics for the main variables in this study. It can be noticed that operating cash flows (median = 0.060) constitutes the highest percentage of net income (median= 0.074), and it forms approximately 81% of earnings. Moreover, the discretionary accruals (mean= 0.006) is higher than nondiscretionary accruals (mean= 0.003), and it is roughly twice as high. Comparing nondiscretionary accruals to net income reveals that it forms 86%; the remaining percentage represents discretionary accruals. Based on that, it would be expected that the market will place more weight on nondiscretionary income than on discretionary accruals, or even disregard them if the market does not price discretionary accruals at all.

Table 4.1
Descriptive results for key variables

	P	MV	CFO	NDIN	TA	NDAC	DA	NI
Mean	3.820	1.310	0.078	0.081	-0.004	0.003	0.006	0.085
Median	2.380	1.160	0.061	0.064	0.001	-0.003	0.000	0.074
Maximum	23.00	6.055	1.770	2.300	1.400	0.650	1.850	1.730
Minimum	0.180	0.250	-0.566	-0.605	-1.337	-0.400	-0.619	-0.250
Std. Dev.	3.640	0.670	0.197	0.225	0.206	0.097	0.145	0.148

P: stock prices at end of March for firm i at time t.
MV: market value computed as prices at end of March multiplied with number of shares issued for firm i at time t.
CFO is operating cash flows for firm i at time t.
NDIN: nondiscretionary income for firm i at time t.
TA: total accruals (net income-CFO) for firm i at time t.
NDAC: nondiscretionary accruals for firm i at time t.
DA: discretionary accruals (estimated from modified model in chapter 3) for firm i at time t.
NI: net income for firm i at time t.

Table 4.2 presents the correlation matrix of the components of net income. Net income has the highest correlation with market value (r =80%), whereas nondiscretionary income is correlated by 73.4% with market value and operating cash flows and market value have 70% correlation. These correlation values give a preliminary indication about the importance of each level of earnings. Discretionary accruals have a higher correlation with market value than nondiscretionary accruals (29.7% and 8.9% respectively), and this highlights the importance of discretionary accruals. Hence, net income, which includes discretionary accruals, has the strongest correlation with market value.

Table 4.2
Correlation matrix for key variables

	MV	DA	NDACC	NDIN	NI	TA	CFO
MV	**1.000**	0.298	0.089	0.734	0.802	-0.279	0.703
DA	0.299	**1.00**	0.003	0.208	0.143	-0.154	0.211
NDACC	0.089	0.003	**1.000**	0.302	0.049	0.293	-0.225
NDIN	0.735	0.207	0.302	**1.000**	0.575	-0.625	0.860
NI	0.801	0.143	0.048	0.575	**1.000**	0.052	0.562
TA	-0.279	-0.154	0.290	-0.625	0.052	**1.000**	-0.795
CFO	0.703	0.210	-0.224	0.861	0.562	-0.796	**1.000**

MV is market value: prices at end of March multiplied with number of shares issued for firm i at time t.
CFO: Operating cash flows for firm i at time t.
NDIN: nondiscretionary income for firm i at time t.
TA: total accruals (net income-CFO) for firm i at time t.
NDAC: nondiscretionary accruals for firm i at time t.
DA: discretionary accruals (estimated from modified model in chapter 3) for firm i at time t.
NI: net income for firm i at time t.

4.8 Results:

The first set of tests is running univariate analysis, for each measure of performance. The test begins by comparing the slope coefficient of each level, then by comparing the explanatory power of each model. Results of each model are displayed below.

Table 4.3
Univariate results for model 1: Operating cash flows

	R^2	Adjusted R^2	AIC
0.558 (2.230)*	0.052	0.041	2.010

MV_{it}: is market value for firm i in year t, and is the product of multiplying share price with number of issued shares.
CFO_{it}: operating cash flows for firm i in year t.
Mv_{t-1}: market value from period t-1, and is the deflator (scale) variable to reduce heteroskedasticity.
: Slope coefficient of operating cash flows.

AIC is Akaike Information Criteria score.
*t values at a 5% significance level.

Table 4.4
Univariate results for model 2: Nondiscretionary income

	R^2	Adjusted R^2	AIC
0.674 (3.110)**	0.076	0.065	1.980

MV_{it}: is market value for firm i in year t, and is the product of multiplying share price with number of issued shares.
$NDIN_{it}$: nondiscretionary income for firm i in year t, and is the sum of operating cash flows and nondiscretionary accruals.
Mv_{t-1}: market value from period t-1, and is the deflator (scale) variable to reduce heteroskedasticity.

α_2: Slope coefficient of nondiscretionary income.
AIC is Akaike Information Criteria score.
** t values at a 1% significance level.

Table 4.5
Univariate results for model 3: Net income

	R^2	Adjusted R^2	AIC
2.820 (10.568)**	0.402	0.395	1.550

MV_{it}: is market value for firm i in year t, and is the product of multiplying share price with number of issued shares.
NI_{it}: net income (earnings) for firm i in year t.
Mv_{t-1}: market value from period t-1, and is the deflator (scale) variable to reduce heteroskedasticity.
: Slope coefficient of net income.

AIC is Akaike Information Criteria score.
** t values at a 1% significance level.

The slope coefficient of operating cash flow is (0.560), significant at a 5% confidence level, which is the first measure of performance. The second measure of performance is nondiscretionary income, and has a slope coefficient of (0.670); significant at a 1% confidence level. This means that nondiscretionary income have more information content than operating cash flows. The net income coefficient is the highest (2.820); significant at a 1% confidence level. These results show the importance of total accruals generally and discretionary accruals particularly, since net income contains both nondiscretionary and discretionary accruals.

The explanatory power of each model is examined through the adjusted R^2 and Akaike information Criterion (AIC). The adjusted R^2 and AIC for the first model is 4% and 2.014 respectively, the nondiscretionary income has a higher adjusted R^2 (6.5%) and a

lower AIC (1.980)[5], which indicates that market prices nondiscretionary accruals more (slightly) than operating cash flows. The third model has the highest adjusted R^2 (39.5%) and the lowest AIC (1.550) which indicates that the market prices total accruals higher than both operating cash flows and nondiscretionary accruals.

The following table summarises the coefficient slope and explanatory power for each model.

Table 4.6
Summary of the three univariate models

		Adjusted R^2	AIC
Model 1: *CFO*	0.558	4.0%	2.014
Model 2: *NDIN*	0.670	6.5%	1.980
Model 3: *NI*	2.820	39.5%	1.550

CFO: Operating cash flows.
NDIN: nondiscretionary income.
NI: net income.
AIC is Akaike information Criterion, the lower the score the better the model.

Thus, the market attaches a slightly higher value for nondiscretionary income than for operating cash flows, but attaches a much higher value for net income. This indicates that the market treats nondiscretionary accruals and discretionary accruals as contributing factors to the value relevance of net income.

The second group of results relate to the multivariate analysis. The purpose of this test is to examine the pricing of each component of net income. First, net income is decomposed into operating cash flows and total accruals, results are displayed in Table 4.7. The slope coefficient for total accruals (2.920) is higher than the coefficient of operating cash flows (2.870), which indicates that the market attaches a higher value on total accruals than on cash flows; this result is consistent with Subramanyam (1996) and Dechow (1994).

[5] When comparing models using Akaike Information Criterion, the lowest score indicates a better model

Table 4.7
Multivariate results for model 4

		R^2	Adjusted R^2	AIC
2.870 (9.430)**	2.920 (10.100)**	39.78%	38.76%	1.57

MV_{it}: is market value for firm i in year t, and is the product of multiplying share price with number of issued shares.
CFO_{it}: net income (earnings) for firm i in year t.
TA_{it}: total accruals for firm i in year t.
Mv_{t-1}: market value from period t-1, and is the deflator (scale) variable to reduce heteroskedasticity.

Slope coefficient of operating cash flows.
Slope coefficient for total accruals.
AIC is Akaike Information Criteria score
** t values at a 1% significance level.

Table 4.8
Multivariate results for model 5

		R^2	Adjusted R^2	AIC
0.519 (2.100)*	1.260 (2.500)*	8.450%	6.890%	1.980

MV_{it}: is market value for firm i in year t, and is the product of multiplying share price with number of issued shares.
CFO_{it}: net income (earnings) for firm i in year t.
NDA_{it}: nondiscretionary accruals for firm i in year t.
Mv_{t-1}: market value from period t-1, and is the deflator (scale) variable to reduce heteroskedasticity.

Slope coefficient of operating cash flows.
Slope coefficient for nondiscretionary accruals.
AIC is Akaike Information Criteria score.
* t values at a 5% significance level.

Table 4.9
Multivariate results for model 6

		R^2	Adjusted R^2	AIC
0.895 (4.770)**	2.290 (8.030)**	32.380%	31.230%	1.680

MV_{it}: is market value for firm i in year t, and is the product of multiplying share price with number of issued shares.
$NDIN_{it}$: nondiscretionary income (earnings) for firm i in year t.
DA_{it}: discretionary accruals for firm i in year t.
Mv_{t-1}: market value from period t-1, and is the deflator (scale) variable to reduce heteroskedasticity.

Slope coefficient of nondiscretionary income.
Slope coefficient for discretionary accruals.
AIC is Akaike Information Criteria score.
** t values at a 1% significance level.

Table 4.10
Multivariate results for model 7

			R^2	Adjusted R^2	AIC
0.789 (3.679) **	1.290 (2.979) **	2.280 (7.960) **	32.770%	31.240%	1.690

MV_{it}: is market value for firm i in year t, and is the product of multiplying share price with number of issued shares.
CFO_{it}: net income (earnings) for firm i in year t.
NDA_{it}: nondiscretionary accruals for firm i in year t.
DA_{it}: discretionary accruals for firm i in year t.
Mv_{t-1}: market value from period t-1, and is the deflator (scale) variable to reduce heteroskedasticity.

Slope coefficient of operating cash flows.
Slope coefficient for nondiscretionary accruals.
Slope coefficient for discretionary accruals.

AIC is Akaike Information Criteria score.
** t values at a 1% significance level.

The next step is decomposing nondiscretionary income into operating cash flows and nondiscretionary accruals; this step is an extension for the model 2, where market value is regressed on nondiscretionary income. Results in Table 4.8 show that the coefficient for nondiscretionary accruals (1.260) is higher than the coefficient for operating cash flow (0.519). Therefore, the market is attaching a higher value for nondiscretionary accruals than cash flows. The importance of nondiscretionary income (in model 2) is because nondiscretionary accruals have more information content.

In model 6, market value is regressed on nondiscretionary income and discretionary accruals, which is another form of earnings decomposition. The results in Table 4.9 show that the market attaches a much higher value on the discretionary accruals than on nondiscretionary income, bearing in mind that the discretionary accruals are a product of earnings manipulation to remain listed in the first market. Thus, if the market is efficient, the discretionary accruals will be regarded as useless from an earnings *value-relevance* perspective. Consequently, it will not be priced and the slope coefficient will not be significant. But the results show that discretionary accruals have more value attached by the market than nondiscretionary income.

Model 7 extends the previous model by decomposing nondiscretionary income into its basic components, nondiscretionary accruals and operating cash flows. Market value is regressed on both of them, in addition to discretionary accruals. The results of the model are shown in Table 4.10. Results show, as before, that the market attaches a higher value on discretionary accruals than nondiscretionary accruals and operating cash flows. The results in this model are an extension for model 3, where market value is regressed on net income, and slope coefficient for net income was higher than nondiscretionary income and operating cash flows. The results for model 7 can also be compared with model 4, where total accruals have a higher slope coefficient than cash flows. Hence, total accruals have a higher coefficient because the market is pricing discretionary accruals higher than nondiscretionary accruals. The adjusted R^2 and the (AIC) scores for the four models in the multivariate analysis are presented in the following table:

Table 4.11
Summary comparisons for the multivariate models

Model	R^2	*Adjusted* R^2	*AIC*
Model 4: *CFO+TA*	39.70%	38.70%	1.57
Model 5: *CFO+NDA*	8.45%	6.89%	1.98
Model 6: *NDIN+DA*	32.38%	31.23%	1.69
Model 7: *CFO+NDA+DA*	32.77%	31.24%	1.69

Discretionary accruals have more incremental information content than nondiscretionary accruals; when comparing model 7 and model 6 with model 5, results show that the adjusted R^2 is higher and the AIC is lower for models 7 and 6.

4.8.1 Tests for competing non-nested models:

To compare the models with each other as competing non-nested models, the R^2 is not the proper statistical test. Therefore, the Vuong test (Vuong, 1989) is applied to examine which model better explains the market value and has more relative explanatory power (Dechow, 1994; Subramanyam, 1996). The Vuong test (Vuong, 1989) is based on the Maximum Likelihood method (ML). This method produces estimates of the coefficients that are identical to the ones estimated by the Least Squares method (LS). The only difference between the two methods is estimating the squared residuals ($\hat{e}^2$). The (LS) method estimates sum of squared residuals (RSS) as:

Where:

μ_i^2 is the squared residuals from derived as $\mu_i = Y_i - \alpha X_i$ using the (LS) method

n is the sample size.

k is the number of regressors in the model.

The estimation of RSS by the (ML) method is:

Where:

σ_i^2 is the squared residuals derived as $\sigma_i = Y_i - \beta X_i$ using the (ML) method

n is the sample size.

Thus, the (ML) estimator of RSS is biased.

To illustrate the Vuong test procedure, the following two models are set as competing non-nested models:

Model1:

Model 2:

Where, Mv_{it} is market value of shares, CFO_{it} is operating cash flows, NI_{it} is net income, μ_i is residuals from the cash flow model and σ_i is residuals from the second model.

The first model is regressing market value on operating cash flows, and the second model is regressing market value on net income. This is to determine which of the two regressors explains the variation in the shares market value the best. The two models are set to compete to determine which model explains the market value of shares the best. The null hypothesis being tested is neither model is best in explaining the dependent variable. The alternative hypothesis is one model is closer than the other one in explaining the dependent variable.

The first step is to estimate the residuals sum of squares (RSS) using the Maximum likelihood (ML) method, as shown above. The next step is to estimate the log likelihood function [ln L(*Mv*)] for both models as follows:

Where μ_i^2 is the (RSS) from the cash flow model and σ_i^2 is the (RSS) from the net income model and π is a mathematical constant. MV_{NI} is model 2 and MV_{CFO} is model 1.

After that, the likelihood ratio is computed as the following:

This can be expressed as:

Where $\varepsilon_{CFO} = Mv_{it} - \alpha_1 - \alpha_2 CFO_{it}$ and $\varepsilon_{NI} = Mv_{it} - \beta_1 - \beta_2 NI_{it.}$

Vuong (1989) estimates a variance ($\acute{\omega}^2$) for the above likelihood ratio (LR).

Finally, the Vuong statistic test is:

The decision rule for this test is if the Z-score is positively significant, then model 2 (or the income model) is the best model of explaining the phenomenon. On the other hand, if the Z-score is negatively significant, then model 1 (cash flow model) is the better model.

Following the same procedure illustrated above, the models from the two analysis sets (univariate and multivariate) are set up as competing non-nested models. The results for the Vuong test for the competing models are presented in following table:

Table 4.12
Relative explanatory power (Vuong Z-scores)

	Model3 *vs.* Model 1	Model 2 *vs.* Model 1	Model 3 *vs.* Model 2	Model 4 *vs.* Model 1	Model 5 *vs.* Model 1	Model 6 *vs.* Model 2	Model 7 *vs.* Model 5
* Incremental R^2	35.50%	2.50%	33.00%	34.70%	0.39%	24.73	0.01%
Z-statistic	4.45	1.00	4.31	4.41	1.17	3.60	3.58

* incremental R^2 is the difference between the R^2 of the two models

The test are based on the null hypothesis that both models are the same or equal in explaining the market value, if the null is rejected then the alternative is accepted that one model is better than the other in explaining the market value. At a level of significance of 5%, if the Vuong score is higher than (1.96), then the null is rejected in favour that the first model is better than the second, and if the Vuong score is less than (-1.96) then the second model is better than the first. Generally, if the absolute value of the Vuong score is less than (1.96) then both models are explaining the dependent variable equally (i.e. there is no *best* model).

The first test is competing model 3 with model 1 to examine the relative explanatory power of net income compared to operating cash flows. The results show that net income is the better model because it contains total accruals. When comparing between

model 2 and model 1, the Vuong Z-statistic is less than (1.96), thus there is no difference between the two models in explaining the market value. Although in the univariate analysis model 2 had a higher R^2 and a higher coefficient. However, as mentioned earlier, the Vuong test is more powerful and provides statistical evidence that both models are equal. Model 3 is better than model 2 (v = 4.31), this means that net income has the highest explanatory power in the univariate analysis set.

Model 4 is contrasted with model 1 to examine whether total accruals are in fact the factor contribution to value relevance of net income. Results show that model 4 is better than model 1 in explaining the variation in the market value, and total accruals contains higher incremental information than operating cash flows alone. The results also show that there is no difference between model 5 and model 1, and both models are equal or the same in explaining market value, the same result is obtained when comparing nondiscretionary income in model 2 with operating cash flows in model 1. Hence, both operating cash flows and nondiscretionary accruals have the similar explanatory power.

To examine the incremental information content of discretionary accruals, model 6 is compared with model 2. The difference between the two models is the presence of discretionary accruals, and if discretionary accruals are not priced, the explanatory power of both models must be equal. The Vuong statistic shows that model 6 is better than model 2 and the market value is explained more by discretionary accruals.

Similarly, model 7 is compared with model 5 to examine the incremental information content of discretionary accruals. If the market does not price discretionary accruals and understands that they are an outcome of management's manipulation, then both models will have similar explanatory power. The results proves the opposite (v = 3.58), because the market prices discretionary accruals, model 7 has more explanatory power than model 6.

To summarise, results show that discretionary accruals are priced by the market, and receives the highest value among the components of income. The slope coefficient of discretionary accruals is higher than both operating cash flows and nondiscretionary accruals combined. The best models explaining the market value are the ones that contain discretionary accruals. In the univariate analysis, results show that net income is the best regressor, because it contains discretionary accruals while the two other regressors do not contain this component, the same conclusion is drawn through the R^2

and the AIC as well as Vuong's *Z* statistic. Furthermore, the multivariate analysis shows that total accruals are priced higher than operating cash flows because of the discretionary accruals. Moreover, when using discretionary accruals as an explicit regressor in a model, its slope coefficient is the highest and that model is the best one in explaining the variation in stock prices according Vuong's *Z* statistic. Thus, discretionary accruals are not only priced by the market, but receive the highest value among all components of net income. This suggests that the market does not see through the manipulation.

4.9 Conclusion:

The objective of this chapter is to examine whether the market prices discretionary accruals. The discretionary accruals are the product of manager's manipulation to inflate earnings in order to report profits and avoid being removed from the first market. Therefore, the discretionary accruals carry no *real* information relating to the performance of the company.

Results obtained from the tests conducted in this research shows that the market considers discretionary accruals as a *real* component of net income; this indicates that the market cannot differentiate between the three components of earnings.

Subramanyam (1996) argues that discretionary accruals reflect management private information signalled to the market relating to the true economic value of the company, and accordingly the market attaches the proper price or value to it and the market is therefore, efficient. Subramanyam (1996) estimates the discretionary accruals using a cross sectional version of the Jones model (i.e. the residuals) and acknowledges that they contain measurement errors, and that on average earnings manipulation does not occur and is not widespread.

The residuals are not the proper estimates for discretionary accruals for reasons mentioned in the previous chapter. However, Subramanyam (1996) also acknowledges that the research design is not suited to identify discretionary accruals motivated by opportunistic earnings management. Discretionary accruals are estimated in this study using the extended version of the Jones model as developed in chapter two and applied in chapter three. This model overcomes the problems in the original model by Jones (1991) by estimating the discretionary accruals using an incentive and an accrual account and having the residuals representing white noise.

This chapter is designed based on opportunistic earnings management that takes place in the first market. The results not only show that the market prices discretionary accruals but also attaches a higher value to it than the other two components. The slope coefficient for discretionary accruals is the highest in model 6 when compared to nondiscretionary income and in model 7 when compared to operating cash flows and nondiscretionary accruals. This means that either the market cannot, at least, tell the difference between what is discretionary and what is not, or they are misled to the extent

that made them overreact and consider the discretionary accruals as the most important component of earnings that contains the true economic value of the company. The latter explanation is more likely since the slope coefficient is priced the highest.

The results support the notion that discretionary accruals are causing distortion to the value relevance of net income. Managers are signalling an optimistic view of the performance for their companies, when in fact it is pure manipulation. The market intercepts this signal and translates it into information for decision making. Thus, earnings management is distorting the relevance and reliability of accounting information.

To comment on Subramanyam (1996) conclusion that discretionary accruals are priced because they represent management private information. This is invalid for firms listed in the first market in Amman Stock Exchange. The discretionary accruals are likely to be a product of, and only of, management effort to remain listed in the first market. Therefore, at the time of the manipulation the discretionary accruals should not be priced. However, they might contain information value in situations where there is no earnings management. Moreover, if the market *cleverly* decomposes discretionary accruals into an information content component and earnings management component, then the slope coefficient for the discretionary accruals will be less than both operating cash flows and nondiscretionary accruals. However, the results show that discretionary accruals receive a higher value than both operating cash flows and nondiscretionary accruals.

Market efficiency theory states that all available accounting information as well as private information is incorporated in the stock price. Moreover, the market understands the different accounting methods used and how it affects the net income figure, and that the market can differentiate between real and nominal revenues and expenses. For example, if a company changes its depreciation method from a fixed rate to a declining rate, the depreciation expense will decrease as the life of the asset expires, resulting in a higher income figure.

The results of this chapter suggest the opposite to this theory. The Amman Stock Exchange (ASE) is not an efficient market. The investors price all components of income but prices discretionary accruals the most. This indicates that the market overreacts to the loss reversal. In other words, companies that are reporting profits will

be priced normally. But when a company reverse losses, the market attaches a higher value to the discretionary accruals component. Profit firms, and based on the model of this research, will have no discretionary accruals because they have no incentive to manipulate. As a result, discretionary accruals for these firms equals zero. On the other hand, for firms that reverse losses, the model will estimate the discretionary accruals for these firms. The market overreacts and attaches a higher value to these discretionary accruals thinking that they represent private information signalled to the market by managers. Daniel et al. (1998) state that the market overreacts to private information and under reacts to public signals. In this case, operating cash flows and nondiscretionary accruals are public information, whereas discretionary accruals are private information. However, the discretionary accruals are a product of earnings management based on the results in chapter three. Another possible explanation is the market reaction to the high quality management style for firms that reverse their losses. The market could be interpreting the loss reversal as excellent crisis management and as a result, the market places more confident in the firm's management

In conclusion, the manipulation taking place in the first market is considered effective. Companies are managing earnings to remain listed in the first market, and the market is attaching value for this manipulation, perceiving it as a genuine component of earnings with incremental information content about the economic value of the company.

Chapter Five

Detecting Earnings Management in Loss Reversal Firms

5.1 Introduction:

In chapter two, the Jones model (Jones, 1991) is modified and extended to measure discretionary accruals with an added variable instead of using the residuals. The underlying assumption for this model is it detects earnings manipulation only in the firms that respond to an event that represents a motivation for earnings management. Jones (1991) restricted the sample to include only firms that applied for import relief grants, which is an event that applies on all the firms in the sample. Studies conducted later, applied the Jones model cross-sectionally on a whole sample of firms without separating between firms based on whether they share a similar inventive. As a result, the residuals (the measure of discretionary accruals) of the Jones model indicate that some firms are manipulating upward and some firms are manipulating downward. Therefore, the extended Jones model includes an accrual variable that represents the manipulation tool and an indicator variable that cluster the firms based on the incentive. In other words, firms that share the same incentive will manipulate using a specific accrual and they will probably use the same approach (tool) to manipulate.

In this chapter, the model is applied on loss reversal firms. The incentive for these firms is to reverse back to profitability and signal to the market that losses are temporary and are generated due to some unusual or nonrecurring operations or due to activities that will increase the firm's future value. The assumption in this chapter is firms that report losses in the previous year and undertake R&D activities will manipulate their earnings in the current year in order reverse to profitability. The model will measure the nondiscretionary accruals for the all firms in the sample, but it will measure discretionary accruals only for loss firms with the same incentive to reverse. Profit firms are assumed not to manipulate due to the absence of the specific incentive (i.e. reversing). This chapter applies the model on a sample from the UK and a sample from the US for two reasons. The first reason is the increasing frequency of firms reporting losses in the last three decades in these countries due to more conservative standards which leads to more timely loss recognition. The second reason is comparing the

manipulation for loss reversal firms under two different accounting and institutional frameworks.

The results of this chapter suggest that not all loss firms manipulate to reverse their losses. Loss firms that undertake R&D activities and are investing in these projects at a changing level are manipulating to reverse back to profits. This suggests that the R&D loss firms' wants to provide some evidence to the market by reversing their losses that benefits of previous R&D activities are paying in. Previous studies show that the market values R&D as assets with potential future benefits. The managers of loss firms that undertake R&D projects will want to maintain the market's confidence in their firms.

5.2 Literature Review:

The literature review is grouped into five subsections based on the general aim of the studies. The past literature examined loss firms and components of losses and how the market values loss making firms.

5.2.1 Studies examining the effect of losses on the value relevance of earnings:

Hayn (1995) study measures the effect of reporting losses on the return-earnings relation and its cross sectional and inter-temporal variation. The paper examines the effect of losses on the association of returns with earnings as the accumulated period increases, and whether this affect evoke the market to adopt an abandonment (liquidation) option. The paper examines the returns-earnings association for two subsamples; the profit firms' sample and the loss firms' sample. Results show that stock price movements are more strongly linked to current period earnings for the profit firms' sample. While for the loss firms' sample, reported losses are not correlated with contemporaneous stock prices. The paper also finds that by excluding the loss firms from the sample, the one-year earnings response coefficient (ERC) and the explanatory power of annual earnings with respect to contemporaneous returns increases drastically. Similar results are obtained when using either changes in earnings or levels of earnings.

The findings of the paper indicate that pooling profitable and loss observations in one sample to estimate the information content of earnings, leads to downward bias in the (ERC). And as a consequence, it leads to downward bias in the association between returns and earnings.

Martikainen (1997) investigates the effect of losses on the earnings response coefficient (ERC) in different financial leverage and growth opportunities categories. The paper argues that the (ERC) differs in firms with high financial leverage compared to firms with low leverage. Similarly, the (ERC) are compared for firms with high growth opportunities and with low growth opportunities.

Results indicate that losses impact on the earnings response coefficient is the highest in firms with high growth opportunities and in firms with low financial leverage. On the other hand, results show no impact of losses on (ERC) in firms with high financial leverage or low growth opportunities. The overall result indicates that the impact of

growth opportunities and financial leverage on the earnings response coefficient becomes more apparent when losses and profits are separately analyzed.

Collins et al. (1999) investigate the unusual negative coefficient on earnings in the simple earnings capitalization model for loss firms. This means that as the firm's earnings per share becomes more negative, higher becomes its stock price.

The paper's main assumption is the omission of book value of equity from the simple earnings capitalization model makes the model misspecified and explains the anomalous negative earnings coefficient. The findings show that when adding the book value of equity to the simple earnings capitalization model, the coefficient on earnings becomes either significantly positive or insignificantly different from zero. The results also show that by omitting the book value of equity from the model induces a negative bias in the earnings coefficient for loss firms; it also introduces a positive bias for profit firms. Overall, the findings of the paper suggest that in the presence of losses, the market rely on book value of equity as a proxy for expected future earnings and/or a proxy for abandonment value. Based on that, the market is able to assess the firm's ability to reverse to profitability.

5.2.2 Studies examining the relation between accounting conservatism and losses:

Givoly and Hayn (2000) explore the relation between earnings and cash flows in order to spot any structural changes in the accounting reporting system. The study examines the changes in the time series properties of earnings, cash flows and accruals and whether these changes are consistent with the increased conservatism in financial reporting.

The paper finds a decline in the reported earnings over time and this decline is not accompanied by a similar decline in cash flows. Their results show a large accumulation of non-operating accruals over the time period under investigation. Moreover, the study shows evidence of a negative skew in the distribution of earnings relative of cash flows. The results also show more timely recognition of losses than profits. This indicates, as well as the overall results, an increase in the conservatism of financial reporting over time. The evidence of this paper suggests that the increase in reporting conservatism is one of the underlying reasons for the increase in the frequency of reported losses over time.

Ball and Shivakumar (2005) examine timely loss recognition for private and public firms in the UK. The study posits that timely loss recognition is an important attribute of financial reporting quality. The paper assumes that the market demand for higher quality of financial statements differs significantly between private and public companies.

The results show that loss recognition is not as widespread in private companies as in public companies. This suggests that the market demands higher quality reporting from public companies, hence more timely loss recognition. Based on that, the paper examines further why public firms recognise loss more frequently than private firms. The paper argues that since public firms incorporate more negative transitory components in the earnings than private firms, could suggest that managers are taking big baths to increase the probability of reporting profits in later periods. Hence, this would suggest earnings management rather than timely loss recognition. They test this argument by examining if earnings and change in earnings can predict future cash flows. Because timely loss recognition would make earnings more informative about firms ability to generate future cash flows. However, results show no evidence of earnings management, which suggests that the presence of more negative transitory components in earnings is due to timely loss recognition.

Klein and Marquardt (2006) examine the non-accounting factors and their role in generating losses. Consistent with Givoly and Hayn (2000), the paper shows a significantly positive temporal association between accounting losses and accounting conservatism. Building on that, the paper adds firm size, real performance as measured with operating cash flows and business cycle effects to investigate the incremental roles of these factors in explaining accounting losses.

The paper finds that the frequency of losses is positively related to small firms and negatively related to operating cash flows and to macroeconomic productivity. These results indicate that non-accounting factors tend be more influential than accounting factors (i.e. accounting conservatism) in explaining how accounting losses are generated. The paper extends these findings to explain why small firms tend to report more profits. Their evidence shows that small firm's economic characteristics, such as higher idiosyncratic risk and lower diversification, contribute to their likelihood of realizing accounting losses over time.

5.2.3 Studies examining loss reversal:

Joos and Plesko (2005) examine how investors evaluate loss reporting firms given the increase in the frequency of firms reporting losses over the last three decades. The paper posits that investors assess the probability of loss reversal and price earnings based on that probability.

The study rearranges the sample into two groups of firms based on their likelihood of reversal: the persistent loss group, which has the lowest probability of reversal, and the transitory group with the highest probability of reversal.

Joos and Plesko (2005) finds that the annual earnings response coefficient (ERC) in the transitory group is significantly positive, while the (ERC) in the persistent group is insignificant. Furthermore, time-series analysis show that the (ERC) in the persistent group becomes significantly negative, indicating that larger persistent losses correspond to higher returns over time. This result is inconsistent with the abandonment option suggested by Hayn (1995). The paper examines thoroughly this pattern and documents a large negative cash flow component of earnings in the persistent group and contributes that to the presence of a large and increasing R&D component. Accordingly, the paper examines the effect of the R&D component to explain the change in persistent losses valuation. The persistent group is partitioned into two subgroups based on the presence of R&D in the losses.

Results show that investors price the R&D component as an asset and consider the non-R&D component as a transitory loss and price it positively. That is, the investor understands the different components of earnings and has the ability and sufficient sophistication to properly decompose the earnings and evaluate the company based on whether it reports losses as a signal of financial distress or a signal for future growth and development.

Jiang and Stark (2006) examine the loss reversal firms in the UK context. They find that the UK is very similar to the US with respect to the increasing number of firms reporting losses since the early 1990's. The study examines the determinants of loss reversal in order to investigate the predictive ability of the loss reversal models.

Jiang and Stark (2006) apply the same loss reversal models as in Joos & Plesko (2005) but with two key differences. The paper uses less number of years prior to the loss year

to increase the number of observation included in the sample. Joss and Plesko (2005) only included observations with available data of five years prior to the loss year. Applying same requirement on the UK sample will result in fewer observations included in the sample making the loss reversal models less useful. Furthermore, the paper decomposes the earnings variable into three components; earnings before R&D and extraordinary items, R&D expenses, and extraordinary items. The paper argues that this decomposition is better because companies frequently classify transitory items as extraordinary when facing losses. The paper argues that transitory items might distort the nature of losses.

Using a sample of loss observations from 1991 to 2004 Jiang & Stark (2006) apply the loss reversal models. The paper finds that accounting information from current and past years is helpful in explaining the likelihood of one-year-ahead loss reversals in the UK. Generally, their results confirm the findings of Joos & Plesko (2005) by showing similar patterns for loss reversal in the UK to the US.

5.2.4 Studies examining earnings management in loss firms:

Barua et al. (2006) examine the association between earnings management and firm profitability to meet with analysts' forecast and exceeding prior year earnings. The paper investigates these two benchmarks for firms with pre-managed profits versus firms with pre-managed losses.

The paper uses pre-managed earnings rather than reported earnings as the measure for profitability. Pre-managed earnings are computed as reported earnings minus abnormal accruals. In other words, the paper examines accrual behaviour (earnings management) to meet with analysts' forecast and prior period earnings between firms with pre-managed profits and firms with pre-managed losses.

Results show that firms with pre-managed profits are more likely to manipulate accruals to meet with earnings benchmarks than firms with pre-managed losses. The paper findings suggest that profitable firms have greater incentives to manipulate than loss firms to meet with analysts' forecasts and prior period earnings.

Pinnuck and Lillis (2007) examine whether reporting losses acts as a heuristic to divest unproductive investments due to the resolution of agency problems. The paper aims to show that the binary classification of firms into profit and losses is a powerful heuristic

that can have real economic consequences other than creating incentives for earnings managements.

The paper argues that the loss heuristic acts as a major disciplinary event that resolves agency problems and results in the managers' incentives being realigned with shareholders. The losses act as a trigger to exercise the abandonment option and divest factors of production, divisions and projects with negative net present value. The paper uses employees as the proxy for investment because they represent a major cost, and in the event of reporting losses, they will be the first investment to be cut. Additionally, investments in employees are both liquid and reversible; this allows observing a continuum of divestment.

Pinnuck and Lillis (2007) document a discontinuity at the zero earnings threshold in the level investment between small profits firms and small loss firms, which is attributable to small loss firms having lower than expected investments in employees. Evidence shows that the discontinuity is due to small loss firms reporting a significantly greater percentage of discontinued operations than small profit firms. This is consistent with a regime shift at the zero earnings threshold in the decision to discontinue operations. Moreover, evidence shows that when firms first moves from reporting profits to reporting losses, the zero earnings threshold acts as a catalyst for a decline in investment in employees that is greater than the expected fundamental demand impact for such a change.

This result adds additional explanation for the kink in the earnings distribution around the zero benchmark, because the variability in the earnings of loss firms is greater in the event that once-off restructuring charges incurs and as a result more firms are likely to lie in the extremes of the earnings distribution. Furthermore, the paper provides additional evidence that the impact of loss heuristic on the incentive to divest employees is stronger for large firms. The divestment of employees is greater for firms with a high (ERC) and high share turnover. The overall result of the paper is loss reporting acts as a decision cue to divest employees and discontinue operations. The loss heuristic is a major disciplinary event that reduces agency conflicts and changes managers' incentives toward taking real actions to improve performance.

Callen et al. (2008) investigate how the past and expected future losses and negative cash flows' of a firm motivate managers to overstate revenues and debtors in order to

induce a higher market valuation. The paper argues that the market substitutes revenues and revenue growth for earnings and earnings growth for loss firms because the losses or negative cash flows do not provide any value relevant information.

The results show that for loss firms' revenues are value relevant in explaining their market value whereas earnings and operating cash flows are not significantly associated with the market value. The study documents a positive relation between the number of years that a firm exhibits and/or anticipates losses or negative cash flows and its investment in debtors.

These results are consistent with loss firms being more likely to manipulate revenues than profit firms. Additionally, the paper provides evidence that there is a positive relation between the *ex ante* probability of revenue manipulation and the number of years that a firm exhibits and/or anticipates losses or negative cash flows. This relation becomes more significant for negative cash flows than for earnings. An important finding the paper documents is revenue manipulation is associated with the history of losses or negative cash flows for firms with different age, size and growth. This contradicts the intuition that only young small firms are more likely to manipulate revenues.

Mosebach and Simko (2009) investigate the role of discretionary accruals in firms that reverse to profitability after a persistent loss state. The primary objective of the paper is to test whether firms sustain profitability for at least four quarters after the loss periods. The paper argues that managers are motivated to use accounting discretion to sustain profitability after reversing from a long period of losses. Based on that, firms sustain profitability through income decreasing accruals (e.g. reserves) in periods leading up to an initial profitable period. The paper finds in all loss firms a consistent pattern of income decreasing discretionary accruals in their preceding loss quarters. This pattern however, is different for firms sustaining profitability from firms that are unable to sustain.

For firms that are unable to sustain profitability, results show that they use less income decreasing accruals than firms sustaining profitability in the quarters preceding and including the initial reported period. Moreover, results reveal a strong negative relation between past discretionary accruals and firms' ability to sustain profitability, which is consistent with firms sustaining profitability employing a wider use of conservatism

accounting discretion during their loss quarters. Overall, the paper concludes that firms remaining profitable after periods of consistent losses are distinguishable by their use of prior negative accounting discretion through building reserves. This mechanism allows the firm to build an accrual component of earnings that will be used in future periods. In other words, these decreasing discretionary accruals are used as insurance against future losses when the firm once again becomes profitable.

5.2.5 Studies examining components of losses:

Darrough and Ye (2007) examine the stereotype of loss firms portrayed in previous studies of being suffering from financial distress and facing bankruptcy, liquidation or any other extreme transformations. The paper argues that many loss firms do not fit this stereotype. Because, for example, some firms record write-offs due to organizational restructures, and hence reports a loss, but are not operationally or financially distressed. Moreover, the paper shows that many firms suffer from persistent losses but remain in business for many periods.

The focus of this paper is to examine in detail the value drivers of loss firms. Specifically, the paper explains that the probability of loss firms staying in business for many years is because they are engaged in operations with future benefits that will increase their value. The paper examines four potential value drivers; particularly, nonrecurring changes, R&D, growth strategy (measured by sales growth) and sustainability. These value drivers give rise to future *hidden assets* for loss firms that will probably generate benefits.

Empirical analysis shows that only R&D and sustainability are able to explain the negative relation between market value and earnings. On the other hand, the other two value drivers do not explain this negative relation, although sales growth reduces the negative relation by only a small fraction. The paper provides evidence that R&D is the major driver that explains the negative relation. This is due to increase in R&D activities which has become a salient feature of a knowledge-based economy. Results also show that sustainability links to R&D intensity. In other words, loss firms that are characterised of having R&D intensive activities report losses for many years, but sustain themselves with external funding. This suggests that the market views these firms of having favourable future perspective.

Schleicher et al. (2007) examine whether the relation between annual report narratives and share price anticipation of earnings varies between loss firms and profit firms. The importance of narratives for loss firms comes from the investors' need of additional information to explain the reasons generating losses for these firms.

Results show that for loss firms the ability of stock returns to anticipate the change in next period's earnings is significantly greater if the firm provides a large number of earnings predictions in the annual report narratives. Moreover, results show no similar pattern for profit firms. This suggests that the market responds more to the non-earnings information disclosed in the narratives for loss firms, since they cannot rely on negative earnings to value the firm.

Oswald and Zarowin (2007) study the effect of accounting choices on the informativeness of stock prices. They examine the information content of stock prices in cases where R&D is capitalized rather than expensed. They use a UK sample of the largest three R&D industries during the 1990s (before the adoption of IFRS) because under the UK GAAP, companies had the choice to either treat R&D as an expenditure or to capitalise it.

The paper regress stock returns against current and future earnings for R&D *capitalizers* and *expensers* and compare the coefficients on the future earnings. The results show that capitalising R&D expense is associated with a higher future earnings response coefficient and conclude that capitalization of R&D is informative than expensing them. The results also provide evidence that accounting choice may affect the amount of information about future earnings.

Franzen and Radhakrishnan (2009) examine the role of R&D expense and its valuation multiplier using a residual-income based valuation model in loss firms and profit firms. The study argues that for profit firms, current earnings are more likely to provide information on potential future earnings due to R&D activities. Accordingly, expected abnormal earnings are more likely to be a linear function of current abnormal earnings. However, the study assumes that there is no linear information dynamics for loss firms that carry out R&D activities. This indicates that expected abnormal earnings for loss firms are not a linear function of current year's negative earnings.

The analytical results suggest, for profit firms, that the valuation multiplier on both earnings before R&D and R&D expense are a function of the discount rate and the growth in R&D investment. In contrast, for loss firms, the valuation multiplier on R&D expense is a function discount rate, growth in R&D and the productivity of R&D investment. Furthermore, the results show that R&D expense are positively associated with stock prices for loss firms, and negatively associated with stock prices for profit firms. The magnitude of the coefficient estimate on R&D is smaller for profit firms than for loss firms. The reason is because the productivity of R&D investment is not fully contained in earnings.

Franzen and Radhakrishnan (2009) also compare the value relevance of earnings and R&D changes for firms that revert to profits. The findings show that the coefficient estimate on R&D is significantly positive in the loss year but insignificantly different from zero in the reversal year. However, if the firm reports another profit year after the reversal, the coefficient estimate on R&D becomes insignificantly negative. Thus, as firms reverse to reporting profits and continue to do so in the future, earnings becomes more valued but R&D does not.

Osma and Young (2009) examine whether firms adjust R&D spending in response to short term earnings pressure. Using a large sample of UK firms that invest heavily in R&D activities, the paper examines the association between R&D spending and earnings targets.

The results show that the probability of cutting R&D expenditure increases when firms fail to report negative earnings. In other words, firms reporting a loss will cut or at least adjust the R&D expenditure in the following period in order to report positive earnings. The results also show that managers targeting specific levels of earnings will shave R&D expenses in an attempt to reach the earnings target. Although R&D is a real activity not a discretionary accrual component, managers still have discretion over it and can adjust this expenditure in order to avoid negative earnings or to achieve specific earnings targets.

5.3 Hypothesis Development:

The purpose of this chapter is to detect earning management in loss firms. Specifically, the focus is to examine whether loss firms manage their earnings to reverse back to profitability.

In this chapter, loss reversal is defined as firms reporting profits immediately after a loss, regardless the loss history of the firm. In other words, this study does not take into consideration the number of loss years before the period in which the firm reports a profit. The argument is loss reversal through earnings management is not affected by the loss history of the firm. Loss reversal cases are considered interesting since the *status quo* is reporting profits; therefore reporting losses places the firm in a temporary position (Joos & Plesko, 2005). It also presents an important incentive, and motivates firms to manipulate in order to report profits again.

Previous studies, as mentioned in chapter two, document firms engaging in earnings management to avoid reporting negative earnings. This is evident in the earnings distribution where a discontinuity in the distribution appears around zero; more than expected observations above zero and less than expected observations below zero (Hayn, 1995; Burgstahler & Dichev, 1997; Degeorge et al., 1999). Specifically, Burgstahler & Dichev (1997) document a discontinuity around the zero benchmark for observations reporting a profit following negative earnings. Based on that, they conclude that firms are highly motivated to manipulate their earnings to report profits in the period following a loss. The frequency of firms reporting losses has increased in recent years and has become a phenomenon (Klein & Marquardt, 2006). Managers of loss firms will always want to signal that losses are temporary or the loss sequence will be brief, for example, loss firms continue to pay dividends as a sign that they will recover very soon (Joss & Plesko, 2005).

The literature review in the previous section sheds the light on the fundamentals of losses. Firms report losses due to the presence of temporary component(s) in earnings (e.g. R&D expenses, restructuring costs). However, these components have potential future benefits, not like other reasons for reporting losses such as financial and operational distress. Research and development expenses (R&D) relate to the firm's continuous efforts to develop the products and business methods in order to increase market share and hence increase its sales revenue. Therefore, R&D expenses represent

hidden assets with potential benefits that will generate and/or increase value in the very near future (Darrough & Ye, 2007). In most cases R&D expenses are considered one of the largest expenses that affect the period's earnings negatively. The *negative* earnings figure will contain components relating to the normal level of performance and other components relating to the potential future performance of the firm. The market therefore cannot rely on negative earnings alone to value the firm, so they classify losses into temporary and persistent according to the component(s) that caused the loss. Based on that, the managers signal to the market that losses are in fact temporary, so they manipulate earnings to reverse back to profits as soon as possible. In other words, the managers have a clear motive to report profits in the period immediately following a loss year to meet with market's expectation. The incentive for reversing to profitability becomes more evident for loss firms investing in R&D activities. These firms despite their losses are viewed as having favourable future outcomes (Darrough & Ye, 2007). Therefore, reversing to profitability will even add more value to firm, because the market will think that the benefits of previous R&D is starting to pay in. Thus, managers of loss firms that are investing in R&D activities have a higher incentive compared to other loss firms that do not invest in R&D to manage their earnings to report profits.

Previous studies argue that accounting standards have become more conservative. Hence, there is an increase in timely loss recognition (Ball & Shivakumar, 2005). Additionally, earnings management becomes less prevail, producing higher quality earnings in situations where more conservative reporting standards are introduced (Barth et al., 2008). Accordingly, loss reversal through earnings management will be examined in this chapter in two different accounting settings applied in the UK and the US. This will provide an opportunity to examine earnings management for loss reversal firms in two different accounting settings but with the presence of the same incentive.

5.4 Sample and Data:

The UK sample consists of all active firms that are publicly quoted. Data are obtained from (FAME) database of *Bureau Van Dijk*. Only manufacturing firms with code classification from 15 to 39 are included according to the UK SIC [2003] classification. The sample includes 154 firms with available data from 2001 to 2008; firms with

missing observations are dropped from the sample. Therefore, the total sample consists of 1232 firm-year observations arranged in cross-sectional format.

Similarly, the US sample includes listed firms in the New York Stock Exchange (NYSE) with US SIC codes from 20 to 39, only manufacturing firms are included. Data are obtained from OSIRIS database of *Bureau Van Dijk*. The sample includes 450 firms with available data from 2001 to 2008. Firms with missing data are deleted; this generates 3582 firm-year observations arranged cross sectionally.

The variables are measured as the following:

Earnings (E) are measured as net income before tax and extraordinary items.

Total accruals (TA) are computed as the difference between earnings and net operating cash flows (CFO):

(eq. 5.1)

Change in sales revenue (ΔREV) is sales in period (t) minus sales in period (t-1):

(eq. 5.2)

Net fixed assets (PPE) are used to control for depreciation, and includes all property, plant and equipment items in year (t).

There are two major accrual accounts used as the measure for discretionary accruals. The first account is change in debtors (ΔDRS) and includes net trade debtors that result from credit sales. It is measured as first difference between net trade debtors in period (t) and period (t-1):

(eq. 5.3)

The second accrual account is change in stock (ΔSTK), which include work in process (WIP) and stock (finished products) and is measured as stock in period (t) minus stock in period (t-1):

(eq. 5.4)

5.6 Hypothesis Formulation:

The main focus of the tests in this chapter is to examine whether loss firms manage earnings to reverse to profitability. Therefore, the loss reversal serves as a clear motive for loss making firms. The probability of reversal is highest in the year following a loss (Joos & Plesko, 2005). Therefore, the manipulation is expected to take place in the reversal year. Moreover, the incentive to manipulate is even greater if loss firms invest in R&D projects. The manipulation is the firm's effort to maintain the market's confidence in R&D projects and to show profits as a sign of collecting benefits from previous R&D activities. If the market stops valuing R&D as assets, then the firm will lose the access and the justification for acquiring funds to finance their operations.

The main hypothesis tested in this chapter is:

H_0: loss firms that undertake R&D activities will not manipulate their earnings to reverse to profitability in the period following a loss.

Earnings management is measured through discretionary accruals. The Jones model (Jones, 1991) as extended in chapter two is applied in this chapter to estimate discretionary accruals. As discussed in chapter two, the Jones model is extended to include an additional variable that controls for the discretionary accruals. The model controls for the nondiscretionary accruals using change in sales revenue (ΔREV) and fixed assets (PPE); discretionary accruals are controlled by change in accrual accounts. The proposed model is as following:

$$\frac{TA_i}{A_{t-1}} = \alpha \frac{1}{A_{t-1}} + \beta \frac{\Delta REV_i}{A_{t-1}} + \gamma \frac{PPE_i}{A_{t-1}} + \lambda \frac{\sum_{j=1}^{N} ACC_{ij}}{A_{t-1}} + \varepsilon_i$$

Where ACC_i is the change in accruals accounts and j= number of accruals manipulated to manage earnings. The most popular accrual accounts in manufacturing firms are the trade debtors' account and the stock account, so either one or even both can be used as tools to manipulate. However, the model must include a variable that represents the incentive. This is necessary to measure earnings management in firms that share the same motive. The assumption here is that only firms with the same incentive will manipulate their earnings to achieve the same target (i.e. reversing to profitability) while other firms (profit firms) will not manipulate. Based on that, a dummy variable will be

multiplied with the accrual account. The dummy variable will equal (1) if a firm reports losses in the previous year and reverse to profitability in the following year. The model is therefore:

$$\frac{TA_i}{A_{t-1}} = \alpha \frac{1}{A_{t-1}} + \beta \frac{\Delta REV_i}{A_{t-1}} + \gamma \frac{PPE_i}{A_{t-1}} + \lambda \frac{D` * \sum_{j=1}^{N} ACC_{ij}}{A_{t-1}} + \varepsilon_i$$

Where:

TA_{it}: total accruals for firm i in year t, measured as the difference between earnings and operating cash flows

ΔREV_{it}: change in sales revenue for firm i in year t.

PPE_{it}: property plant and equipment for firm i in year t.

$\sum ACC_{it}$: Accrual accounts: Δdebtors and/or ΔStock for firm i in year t.

D: dummy variable that equals 1 if the company reports a loss in the previous year AND profits in the current year, 0 otherwise.

A_{t-1}: total assets for firm i in year t, is the scale variable to reduce heteroskedasticity.

5.7 Descriptive results:

Descriptive statistics of key variables are displayed in Table 5.1 for the UK and the US sample. All variables are scaled by total assets at the beginning of the period. Total accruals in both samples are negative because the size of fixed assets in manufacturing firms is considered large, which results in greater depreciation expense. Fixed assets, as a percentage of total assets, is relatively large in the UK sample, it comprises roughly (55%) of total assets, whereas it comprises around (27%) of total assets in the US sample. However, the change in sales to total assets is less in the UK than in the US (5.9% versus 8.7% respectively). The change in debtors is larger than change in stock in the UK sample, but in the US sample both change in stocks and change in debtors are approximately similar. The mean value of R&D expense to total assets from previous period is 0.032 in the UK sample, whereas the mean value for the US sample is 0.049. There are 88 firms out 154 firms that have R&D expense in the UK sample, which is approximately 57% of the total sample. The percentage of R&D firms in US sample is 38.6% (174 firms out of 450 firms included in the sample).

Table 5.1
Descriptive statistics for key variables [1]

	UK sample					US sample				
	obs.	*mean*	*st.dev*	*min.*	*max.*	*obs.*	*mean*	*st.dev*	*min.*	*max.*
Total accruals	1210	-0.037	0.074	-0.290	0.280	3545	-0.025	0.077	-0.480	0.436
ΔSales revenue	1210	0.059	0.274	-3.300	2.100	3545	0.087	0.220	-1.68	2.250
Fixed assets	1210	0.548	0.270	0.024	2.640	3545	0.270	0.165	0.004	2.340
ΔStock	1210	0.008	0.044	-0.300	0.270	3545	0.010	0.039	-0.280	0.430
ΔDebtors	1210	0.011	0.046	-0.200	0.420	3545	0.010	0.043	-0.195	0.465
R&D [2]	275	0.032	0.038	0.0002	0.234	1311	0.049	0.043	0.0002	0.423

[1] After removing outliers from both samples, the UK sample includes 1210 observations from 1232 total observations and the US includes 3545 observations from total 3582 observations.

[2]Percentage of R&D firms in UK sample is 57.14% (88 firms out of all 154 firms included in sample.
Percentage of R&D firms in US sample is 38.66% (174 firms out of all 450 firms included in sample.

all variables are scaled by total assets in period t-1

The following Table shows the correlation matrix between the key variables for the two samples. In the UK sample the accrual accounts, Δstock and Δdebtors, have the highest correlation with total accruals (0.310 and 0.270 respectively). This indicates the higher effect of these accrual accounts on the variation in total accruals. A similar trend is shown for the US sample, where both change in stock and change in debtors have roughly the same correlation with total accruals (approximately 0.300). However, the change in sales revenue has a higher correlation with total accruals when compared to the UK sample. Change in sales is more correlated with total accruals in the US (24.7%) than in the UK (7.9%). This is an indication of how change in sales explains more of the variation in total accruals in the US sample compared to the UK sample. Therefore, it is expected that the nondiscretionary model will be a better fit using the US sample observations since the two nondiscretionary accruals variables (ΔREV and PPE) are more correlated with total accruals than in the UK sample.

Table 5.2
Correlation matrix for key variables in the UK and the US sample

UK variables					
	TA	ΔREV	PPE	ΔSTK	ΔDET
TA	1.000				
ΔREV	0.079	1.000			
PPE	-0.060	0.199	1.000		
ΔSTK	0.312	0.342	0.250	1.000	
ΔDRS	0.27	0.479	0.220	0.420	1.000
US variables					
	TA	ΔREV	PPE	ΔSTK	ΔDET
TA	1.000				
ΔREV	0.247	1.000			
PPE	-0.086	0.185	1.0000		
ΔSTK	0.312	0.516	0.181	1.000	
ΔDRS	0.295	0.541	0.108	0.555	1.000

TA: total accruals.
ΔREV: change in sales revenue.
PPE: fixed assets.
ΔSTK: change in stock
ΔDRS: change in debtors

The following table shows the number of loss firms in each sample. The Table also shows the number of firms that reversed to profitability and the number of firms that did not reverse their losses for each year included in the two samples. As noticed, the average of loss firms in all years included in both samples (2001-2008) are quite similar; 17.5% in the UK and 15.5% in the US. The average loss reversal firms in the US (49%) is slightly higher than the in the UK (45.5%). Overall, and based on these two samples, the loss reporting and loss reversal trends in the UK and the US are quite similar to each other, same conclusion reached by Jiang &Stark (2006)

Table 5.3
Number of loss firms and loss reversal firms in the UK and US samples

UK sample	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
No. of firms in sample	154	154	154	154	154	154	154	154	154
No. of loss firms	21	35	35	32	28	21	22	16	27
Percentage [1]	13.6%	22.7%	22.7%	20.8%	18.2%	13.6%	14.3%	10.4%	17.5%
No. of loss reversal firms [2]	-	7	15	18	13	17	10	11	6
Percentage [3]	-	33.3%	42.9%	51.4%	40.6%	60.7%	47.6%	50.0%	37.5%
No. of loss firms that did not reverse [4]	-	14	20	17	19	11	11	11	10
Percentage [5]	-	66.7%	57.1%	48.6%	59.4%	39.3%	52.4%	50.0%	62.5%
US sample	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
No. of firms in sample	450	450	450	450	450	450	450	450	450
No. of loss firms	44	92	87	69	52	45	49	53	111
Percentage [1]	9.8%	20.4%	19.3%	15.3%	11.6%	10.0%	10.9%	11.8%	24.7%
No. of loss reversal firms [2]	-	20	38	38	42	28	25	30	16
Percentage [3]	-	45.5%	41.3%	43.7%	60.9%	53.8%	55.6%	61.2%	30.2%
No. of loss firms that did not reverse [4]	-	24	54	49	27	24	20	19	37
Percentage [5]	-	54.5%	58.7%	56.3%	39.1%	46.2%	44.4%	38.8%	69.8%

[1] the percentage of firms reporting losses to all other firms in sample.
[2] number of firms that report profits in current year and losses in previous year.
[3] percentage of the number of firms reversing losses in current year to number of firms reporting losses in previous year.
[4] number of firms that report losses in current year and losses in previous year.
[5] percentage of number of firms that report losses in current year to firms reporting losses in previous year.

5.8 Results on loss reversal:

The extended Jones model is applied on a sample from the UK and a sample from US. Results from both samples are shown in the following sections.

5.8.1 Results on loss reversal from the UK sample:

The first set of results comes from the UK sample. Table 5.4 presents the results of the model applied on UK firms using the change in stock as the manipulation tool. The results show that change in sales revenue is significant. Also, the fixed assets variable is negatively significant, which is the expected sign since it controls for depreciation expenses. Both variables control for nondiscretionary accruals. The discretionary accrual measure is significant (t= 2.540) which indicates that loss-reversal firms are manipulating to report profits using change in stock. This suggests that companies are increasing the cost of stock through re-allocation of overhead costs between cost of goods sold and end of period stock. In other words, manufacturing overhead cost are being shifted from the P&L account (cost of goods sold) to the balance sheet (cost of ending stock) as means to capitalise these cost. By doing so, cost of goods sold will be lower which increases gross profit. This is achieved by overstating the value of end of period stocks; as a result the cost of goods sold will be lower. Since the sample consists of manufacturing firms, the cost of sales is computed as:

(eq. 5.5)

Manufactured products (finished products) are computed as:

(eq. 5.6)

Since ΔStock = stock at ending of period- stock at beginning of period, then equation (5.5) can be computed as:

(eq. 5.7)

Therefore, firms can allocate a higher portion of overhead manufacturing costs to end of period stock in the manipulation period which results in increasing the amount of

change in stock. The cost of sales will be understated and gross profits will be overstated, thus increasing reported earnings. (Gross profits = sales revenue- cost of sales).

Table 5.4
Results for loss reversal in UK sample with ΔSTK as manipulation tool

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta STK_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D*\Delta STK_{it}$	Adj-R^2
Coefficient	-14.160	0.025	-0.060	0.364	19.21%
t value	(-0.590)	(3.150)**	(-15.680)**	(2.540)*	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔSTK_{it}: change in stock for firm i in year t,
D: dummy variable that equals 1 if the company reports losses in the previous year and profits in the current year, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
*t values at 5% significance level.
** t values at 1% significance level.
(D*ΔSTK) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

However, when testing to examine whether they use debtors as the manipulation tool (e.g. recognising premature sales) the coefficient of the discretionary accrual measure becomes insignificant (t= -0.970) as shown in Table 5.5.

Table 5.5
Results for loss reversal in UK sample with ΔDRS as manipulation tool

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta DRS_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D*\Delta DRS_{it}$	Adj-R^2
Coefficient	-12.530	0.031	-0.060	- 0.170	18.84%
t value	(-0.520)	(3.800)**	(-15.780)**	(-0.970)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in debtors for firm i in year t,
D: dummy variable that equals 1 if the company reports losses in the previous year and profits in the current year, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔDRS) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

Based on the results, loss firms in the UK are manipulating expenses by increasing the value of stock. This method of manipulation is relatively easier than revenue manipulation, where firms must ship products earlier to distributors (buyers) in order to recognise them during the period of reversal. Early shipping of products to distributors and buyers, known as channel stuffing, is not always easily achieved due to high

competition between manufacturers and/or the economic situation of the buyers. On the other hand, expense manipulation does not require an outside party interaction and is accomplished within the firm. Overhead manufacturing costs are usually allocated to the finished products based on many different methods that managers have discretion over them (e.g. direct method or sequential method). Therefore, they are flexible systems that can be modified to reduce or inflate cost of sales. Furthermore, the firm can increase the number of manufactured products in order to reduce the fixed cost per unit. As the number of products increase the fixed costs becomes more spread and hence the marginal profitability will increase for each unit. Change in debtors can also capture bad debt expenses manipulation; however the amount of manipulation could be small and insufficient to achieve the required targets of manipulation.

The incentive between loss firms to reverse losses through earnings management is not necessarily the same. Some activities firms undertake might generate negative earnings, even though that these activities could increase the value of the firm in the future. Research and Development (R&D) activities affects the earnings negatively in the short term, but on the long term could add value to the firms. As a consequence, firms that invest in R&D can report losses for long periods. Hence, the argument is loss firms that undertake R&D activities have a stronger incentive to manipulate. In order to test this argument, loss firms are divided into two groups; loss firms with R&D and loss firms without R&D. This procedure examines loss reversal through earnings management for firms that invest in R&D activities compared to loss firms that do not undertake R&D. Therefore, for loss firms with no R&D, loss is assumed to be caused by other factors (e.g. financial distress). As mentioned earlier, R&D expenses are viewed by the market as hidden assets with potential future benefits. The market analyse the components of losses and value R&D as assets and expects the loss to be temporarily (Joos & Plesko, 2005). Therefore, R&D firms manipulate earnings to reverse to profitability as quickly as possible to signal the market that R&D benefits are paying. For that reason, and following Joos and Plesko (2005) loss firms in the UK sample are partitioned into two subsamples based on whether they incur R&D expense. The assumption is loss firms with R&D will manipulate earnings to reverse to profitability in the period following a loss, while other loss firms will not have a similar incentive. In order to test this, a new dummy variable is constructed that equals one if the firm reverses back to profitability after a loss period and invests in R&D. Also, a similar dummy is constructed for firms

that do not invest in R&D. Results for R&D loss firms and non-R&D loss firms are shown in the following two tables; Table 5.6 for using change in stock as manipulation tool and Table 5.7 for using change in debtors as manipulation tool.

Table 5.6
Results of loss reversal for R&D and non-R&D firms in the UK with ΔSTK as manipulation tool

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_{R\&D}*\Delta STK_{it}$	$D_{non}*\Delta STK_{it}$	Adj-R^2
Coefficient	-13.400	0.026	-0.060	0.854	0.284	19.28%
t value	(-0.56)	(3.24)**	(-15.7)**	(2.24)*	(1.84)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔSTK_{it}: change in stock for firm i in year t,
$D_{R\&D}$: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities, 0 otherwise.
D_{non}: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND does not invests in R&D activities, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
*t values at 5% significance level.
** t values at 1% significance level.
(D*ΔSTK) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

Table 5.7
Results of loss reversal for R&D and non-R&D firms in the UK with ΔDRS as manipulation tool

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_{R\&D}*\Delta DRS_{it}$	$D_{non}*\Delta DRS_{it}$	Adj-R^2
Coefficient	-10.11	0.033	-0.061	0.498	-0.321	19.00%
t value	(-0.42)	(3.96)**	(-15.8)**	(1.22)	(-1.65)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in debtors for firm i in year t,
$D_{R\&D}$: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities, 0 otherwise.
D_{non}: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND does not invests in R&D activities, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔDRS) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

The results in Table 5.6 show that the nondiscretionary accruals variables (ΔREV and PPE) are significant. Also, the discretionary accruals measure for R&D loss firms is significant, while the discretionary accruals measure for non-R&D loss firms is not significant. These results suggest that R&D loss firms are manipulating earnings to

reverse to profitability by using changes in stock. Loss firms that do not undertake R&D are not manipulating to reverse. The results here expand the explanation for the results shown in Table 5.4; where it shows evidence of earnings management in all loss firms. But this is because the percentage of R&D loss firms to all other loss firms is 57%; therefore, the discretionary accruals measure appears significant. On the other hand, results in Table 5.7 show that the discretionary accruals measure is not significant for R&D and non-R&D loss firms when using change in debtors as the manipulation tool, although the nondiscretionary accruals variables are significant. The overall results show that manipulation by loss firms depend on the components of losses. Since R&D is valued (favourably) by the market as an asset, they expect future profitability for these firms (Joos & Plesko, 2005). On the other hand, loss firms with no R&D are probably valued by the market as firms with operational or financial distress. Thus, the motivation to manipulate earnings is much less in these firms.

5.8.2 Results on loss reversal from the US sample:

The second set of results is obtained from the US sample to examine whether the same manipulation takes place in the reversal year. Results show that the change in sales and fixed assets are significant and with the expected sign. Moreover, the coefficient of the discretionary accrual measure when using change in stock is not significant. Similar results are also obtained when using change in debtors; results are displayed in the following two tables. Therefore, earnings management is not detected for all loss firms in the reversal period for the US sample.

Table 5.8

Results for loss reversal in US sample with ΔSTK as manipulation tool

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta STK_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D*\Delta STK_{it}$	Adj-R^2
Coefficient	1477.4	0.090	-0.111	0.024	15.87%
t value	(3.510)**	(15.400)**	(-24.680)**	(0.190)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔSTK_{it}: change in stock for firm i in year t,
D: dummy variable that equals 1 if the company reports losses in previous year and profits in current year, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔSTK) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

Table 5.9
Results for loss reversal in US sample with ΔDRS as manipulation tool

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta DRS_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D*\Delta DRS_{it}$	Adj-R^2
Coefficient	1459.85	0.089	-0.111	0.140	15.92%
t value	(3.470)**	(15.140)**	(-24.640)**	(1.350)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in stock for firm i in year t,
D: dummy variable that equals 1 if the company reports losses in previous year and profits in current year, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔDRS) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

This suggests that there are other factors that need to be considered in addition to loss reversal. As in the UK sample, the loss firms in the US sample must be partitioned in order to detect earnings management more specifically. Therefore, loss firms will be divided into two groups: R&D loss firms, and non-R&D loss firms. Joos and Plesko (2005) divided the loss firms into two subsamples based on whether they incurred R&D expense. The paper shows that investors analyse the components of the loss and value R&D as an asset with potential future benefits. Similarly, loss firms are divided in this sample based on whether they incurred R&D expenses. The dummy variable ($D_{R\&D}$) equals one if the firm has R&D expenses and reverse its losses. Conversely, the dummy variable (D_{non}) equals one if the firm reverse its losses and does not have R&D. Tables 5.10 and 5.11 show the regression results for the two models; using change in stock and using change in debtors.

Table 5.10
Results of loss reversal for R&D and non-R&D firms in the US with ΔSTK as manipulation tool

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_{R\&D}*\Delta STK_{it}$	$D_{non}*\Delta STK_{it}$	Adj-R^2
Coefficient	1442.24	0.090	-0.111	0.407	-0.195	15.98%
t value	(3.43)**	(15.40)**	(-24.7)**	(1.95)	(-1.23)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔSTK_{it}: change in stock for firm i in year t,
$D_{R\&D}$: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND incurs R&D expense, 0 otherwise.
D_{non}: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND does not invests in R&D activities, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔSTK) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

Table 5.11
Results of loss reversal for R&D and non-R&D firms in the US with ΔDRS as manipulation tool

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_{R\&D}*\Delta DRS_{it}$	$D_{non}*\Delta DRS_{it}$	Adj-R^2
Coefficient	1435.97	0.089	-0.111	0.379	-0.258	16.11%
t value	(3.42)**	(15.19)**	(-24.6)**	(2.92)**	(-1.55)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in stock for firm i in year t,
$D_{R\&D}$: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND incurs R&D expense, 0 otherwise.
D_{non}: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND does not invests in R&D activities, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔDRS) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

The results show the nondiscretionary accruals variables are both significant in the two models. However, there is no manipulation detected for R&D and non R&D loss firms when using change in stock as the manipulation tool. The discretionary accruals measure is not significant (although quite close to be significant t=1.95). On the other hand, results in Table 5.11 shows the coefficient on the discretionary accruals measure is significant for R&D loss firms when using change in debtors. The discretionary

accruals measure is not significant for non-R&D loss firms. When running the model on all loss firms, the results show no indication of manipulation, as shown in Table 5.8. This is because the percentage of R&D loss firms in the US sample is 38.66%, so when the model is applied on the entire sample, results show no indication of manipulation, since the majority of firms are non R&D firms. However, when dividing the loss firms based on the R&D expenses, results show that loss firms with R&D manipulate to reverse to profitability. The manipulation tool is change in debtors, which suggests that these firms recognise sales early in order to increase earnings. This suggests that earnings management behaviour is different among loss firms. For non-R&D loss firms, they simply might need to place real effort to reverse back to profitability since their losses are generated by poor performance or financial distress.

Overall, these results add more explanation to the findings of Joos & Plesko (2005); they find that R&D persistent-loss firms are positively priced by the market. The results here suggest that the market price these firms favourably because they reverse quickly and that the R&D investment has already started to generate benefits.

5.9 Results on loss reversal firms with changing levels in R&D activities:

To further investigate the manipulation behaviour in the reversal period for R&D firms, a procedure similar to the one used by Lev and Zarowin (1999) is adopted. The R&D firms that reverse to profitability are categorised based on the change in R&D expense. The assumption thus far is that loss firms that invest in R&D manipulate earnings to reverse losses and report profits. The argument is since R&D expense is priced by the market as hidden assets with potential future benefits, managers of these firms will manipulate to report profits in order to signal that the R&D benefits are beginning to pay-in.

However, the manipulation could be different in cases where the R&D investing activities are in a steady state or in a changing state. Firms that invest in R&D at fixed percentage from one period to another are not expected to manipulate because the benefits from the previous R&D activities will most likely cover the expenditures of current R&D activities. Also, the informativeness of earnings does not change in firms that have a constant (i.e. steady) rate of R&D spending (Lev & Zarowin, 1999), therefore the market will consider the earnings figure more than the R&D component. On the other hand, firms that change the amount invested in R&D activities every

period are expected to manipulate since the benefits coming from previous R&D activities will probably not be sufficient to cover the current level of R&D expenditure. Hence, the incentive to manipulate in order to reverse losses becomes greater in these firms, and the amount of manipulation is expected to be higher.

Lev and Zarowin (1999) divided the sample into low change R&D firms and high change R&D firms based on the percentage of R&D expense to sales. The paper establishes five portfolios and examines the movement or change of the firms between these portfolios. The findings show that high-change firm's earnings relation with stock returns have declined over time, while low-change firm's earnings association with returns are larger, although not quite significant. However, the paper finds similar results when taking into consideration the increasing frequency of reported losses in the sample. The paper attributes the weak return-earnings relation over time to the failure of the accounting system to account fully for changes in R&D rather than the occurrence of losses. On the other hand, Joos and Plesko (2005) divided the sample into persistent loss firms and transitory loss firms based on the loss history of the firms. Furthermore, the paper examines the R&D activities for persistent loss firms and established two subsamples based on whether the persistent loss firms undertake R&D activities or not. After which, the paper regress returns on earnings before R&D expense and on R&D for the two subsamples. The findings show that the earnings response coefficient before R&D expense is positive for persistent loss firms which suggests that the market prices the R&D expenses as assets. Therefore, the market understands that the R&D is the underlying reason for losses, believing that in the future the company is expecting to receive benefits from the investment in R&D activities.

But the question is for how long will the market continue to price these firms favourably? For example, if a firm is investing heavily in R&D at an increasing rate each period, then they will probably continue to report losses for a quite long period. However, the market will eventually lose trust in the justification for the increasing level of investment in R&D, for they will not realize any profits very soon. The market fixates more on the current reported profitability measures because the market has strong preferences for more value in the short term (Bushee, 2001; Lev et al., 2005). Therefore, loss firms that are in a changing state of R&D investment must report profits at some point of time to provide the market with evidence that they are collecting some of the benefits of previous R&D. Furthermore, if the firm reports profits after the

reversal period for more than one period (i.e. two consecutive periods of profits after the loss period) then the market starts to value earnings more and value R&D less (Franzen & Radhakrishnan, 2009). Hence, these firms are more motivated to manipulate earnings in order to report profits. Based on that, each of the two samples will be divided into two groups based on whether there is any level of change in R&D activities. There will be two groups: changing state and steady state in R&D levels. Changing state firms are the companies that reverse losses and change the amount of R&D spending from one period to another. Conversely, steady state firms are the companies that reverse losses and have a constant rate of R&D spending each period. The reason of this test is to examine if there is any difference in the amount of manipulation between R&D firms if they have changing levels in R&D activities regardless the amount of change (high or low). It is expected that firms in a changing state will be more motivated to reverse through earnings management, while steady state firms are expected to have a less incentive to manipulate since evidence from Lev and Zarowin (1999) show that earnings (or even negative earnings in this case) will not be affected by a steady or constant level of R&D spending.

Moreover, the two samples will be also divided into two groups: high-change R&D loss firms and low-change R&D loss firms. The level of change is based on the average percentage of R&D to sales for all R&D firms. Loss firms that have a higher ratio of R&D to sales than the average score will be classified as high-change, similarly loss firms with a ratio less than the average score will be classified as low-change. This is to examine the incentive to manipulate in the changing state firms, since changing state firms will include high change and low change. It is expected that high change R&D loss firms will not be able to manipulate because it will be more difficult to reverse through earnings management. The amount of R&D will be very large and the amount of manipulation will not be sufficient to reverse losses. However, these firms can reverse losses through *real* earnings management. On the other hand, low change R&D firms have more ability to reverse through accrual manipulation because the change in R&D spending is lower. Overall, the extended Jones model will measure the nondiscretionary accruals for all firms in the two samples, and the composite variable (dummy variable multiplied with accrual account) will measure the discretionary accruals for the firms that have the motivation to manipulate.

The following two tables provide descriptive statistics for the R&D loss firms in the UK sample and the US sample. In the UK sample, the R&D expense is slightly lower in loss reversal firms compared to all R&D firms. Moreover, the percentage of R&D to sales and the change in this percentage is higher for R&D loss reversal firms when compared to all other firms. The change in R&D to sales suggests that loss reversal firms are increasing their R&D activities in a higher rate than other firms in the sample.

In the US sample the R&D expense appears to be higher for loss reversal firms, but the R&D to sales ratio is roughly the same in both groups. The change in R&D to sales ratio for loss reversal firms is negative, suggesting that firms reversing to profits have a declining rate in R&D activities, while for other firms the ratio is increasing.

Table 5.12
Descriptive statistics for UK R&D firms

	All firms[1]			R&D Loss reversal firms[2]		
	———	——	Δ——	———	——	Δ——
Mean	0.032	0.037	0.011	0.030	0.029	0.012
Std. Dev.	0.038	0.070	0.047	0.041	0.047	0.031
Variance	0.001	0.005	0.002	0.002	0.002	0.001
observations	275	275	275	23	23	23

[1] *All firms include profit and loss firms together that undertake R&D activities*
[2] *Loss reversal firms are firms that report a loss in previous period and profits in current period.*

Table 5.13
Descriptive statistics for US R&D firms

	All firms[1]			R&D Loss reversal firms[2]		
	———	——	Δ——	———	——	Δ——
Mean	0.049	0.064	0.002	0.055	0.065	-0.016
Std. Dev.	0.043	0.105	0.056	0.054	0.063	0.059
Variance	0.002	0.011	0.003	0.003	0.004	0.003
observations	1311	1311	1311	87	87	87

[1] *All firms include profit and loss firms together that undertake R&D activities*
[2] *Loss reversal firms are firms that report a loss in previous period and profits in current period.*

5.9.1 Loss reversal firms with changing levels in R&D for the UK sample:

The R&D loss firms are grouped according to whether there is any change at all, regardless of the amount and direction of change in the R&D level between two consecitve periods (i.e. steady state versus changing state). The dummy varaible in this case will equal (1) if the loss-reversal firm has a changing percentage in R&D to sales

compared to the previous preiod, (0) otherwise. The results are displayed in Tables 5.14 and 5.15.

Table 5.14
Results of loss reversal for UK firms with changing state in R&D with ΔSTK as manipulation tool

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta STK_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D*\Delta STK_{it}$	Adj-R^2
Coefficient	-13.140	0.029	-0.608	0.854	19.12%
t value	(-0.590)	(3.670)**	(-15.850)**	(2.230)*	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔSTK_{it}: change in stock for firm i in year t,
D: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the R&D/sales changes from previous period, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
*t values at 5% significance level.
** t values at 1% significance level.
(D*ΔSTK) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

Table 5.15
Results of loss reversal for UK firms with changing state in R&D with ΔDRS as manipulation tool

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta DRS_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D*\Delta DRS_{it}$	Adj-R^2
Coefficient	-13.844	0.029	-0.607	0.501	18.88%
t value	(-0.580)	(3.660)**	(-15.800)**	(1.230)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in stock for firm i in year t,
D: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the R&D/sales changes from previous period, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔDRS) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

The change in sales revenue and fixed assets are significnat in the two models and with the expected sign. The discretionary accrual measure is significant when using change in stock, although still not signifcant when using change in debtors, suggesting that firms with a changing state in the R&D activities are manipulating to reverse losses through increasing stock value. The coefficient on the discretionary accrual measure, when using change in stock as the manipulation tool, is 0.854, which is similar to the

coefficient of the discretionary accruals in Table 5.6. This suggests that all R&D loss reversal firms invest in R&D at a changing rate. Therefore, the results are showing manipulation to reverse losses in firms that are in a changing state of R&D spending, and the comparison here is based on *change* versus *no change*, regardless if the change is high or low.

Since the results show that changing state R&D loss firms are manipulating to reverse losses, the next step is to examine earnings management within the changing-state firms. The changing state firms are divided into high change firms and low change firms. High change firms are R&D firms that reverse losses and the change in the R&D to sales ratio is higher than the average score (0.037) for all R&D firms. Low change firms are R&D firms that reverse losses and change in the R&D to sales ratio is lower than the average score. As suggested above, it is expected that the high change firms will not be able to manipulate. Because firms that invest in R&D at a higher rate will probably find it difficult to reverse through accrual manipulation since the amount of R&D is large. Therefore, low change firms are expected to reverse through earnings management. The regression results are displayed in the following two tables for the UK sample.

Table 5.16
Results of loss reversal for UK firms with high change and low change in R&D with ΔSTK as manipulation tool

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_H*\Delta STK_{it}$	$D_L*\Delta STK_{it}$	Adj-R^2
Coefficient	-13.07	0.029	-0.061	0.463	0.971	19.07%
t value	(-0.55)	(3.69)**	(-15.8)**	(0.58)	(2.23)*	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔSTK_{it}: change in stock for firm i in year t,
D_H: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the change in R&D/sales is higher than industry average, 0 otherwise.
D_L: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the change in R&D/sales is lower than industry average, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
* t values at 5% significance level.
** t values at 1% significance level.
(D*ΔSTK) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

Table 5.17
Results of loss reversal for UK firms with high change and low change in R&D with ΔDRS as manipulation tool

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_H*\Delta DRS_{it}$	$D_L*\Delta DRS_{it}$	Adj-R^2
Coefficient	-13.73	0.029	-0.061	0.226	0.619	18.83%
t value	(-0.57)	(3.66)**	(-15.8)**	(0.30)	(1.27)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in stock for firm i in year t,
D_H: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the change in R&D/sales is higher than industry average, 0 otherwise.
D_L: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the change in R&D/sales is lower than industry average, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔDRS) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

The results are in line with expectations; R&D loss firms that have high-change spending levels are not manipulating to reverse losses. However, results show manipulation for R&D loss firms with low-change levels; the discretionary accruals measure is significant when using change in stock as the manipulation tool. Moreover, the amount of manipulation for low change firms is even higher than the amount of manipulation for all R&D loss firms that are in changing state (0.971 from Table 5.16 compared to 0.854 from Table 5.14). This suggests that the R&D is large even for low change firms. However, low change firms have the ability to manipulate accruals to reverse losses compared to high change firms and the manipulation will most likely be sufficient enough to overcome the negative effect of R&D on earnings. When using change in debtors as the manipulation tool, the discretionary accruals measure for high-change and low-change is insignificant. The nondiscretionary accruals variables in both models are significant.

5.9.2 Loss reversal firms with changing levels in R&D for the US sample:

The above tests are applied on the US sample. The results in Section *5.8.2* show no indication of manipulation for loss reversal firms in the US sample. However, results show evidence of manipulation, through debtors, for loss reversal firms that undertake

R&D activities. In this section, firms are divided into two groups based on whether they have changing levels of R&D regardless the amount of change. This test aims at comparing the incentive to manipulate between firms that are in changing state and steady state in respect to R&D spending. The argument is same as above; firms that have a changing level of R&D spending each period are expected to reverse losses through earnings management, while steady state firms are not. To compare firms with changing state versus steady state in R&D activities, the dummy variable will equal one if the loss firm undertakes R&D projects at a changing state. Similar to the UK sample, comparison is based on *change* versus *no change*, regardless if the change is high or low. Results are displayed in the following two tables.

Table 5.18
Results of loss reversal for US firms with changing state in R&D with ΔSTK as manipulation tool

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta STK_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D*\Delta STK_{it}$	Adj-R^2
Coefficient	1457.138	0.089	-0.111	0.411	15.96%
t value	(3.460)**	(15.360)**	(-24.680)**	(1.920)	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔSTK_{it}: change in net debtors for firm i in year t,
D: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the R&D/sales changes from previous period, 0 otherwise.

All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔSTK) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

Table 5.19
Results of loss reversal for US firms with changing state in R&D with ΔDRS as manipulation tool

$$\frac{TA_{it}}{A_{t-1}} = \alpha(\frac{1}{A_{t-1}}) + \beta(\frac{\Delta REV_{it}}{A_{t-1}}) + \gamma(\frac{PPE_{it}}{A_{t-1}}) + \delta(\frac{D^{`} * \Delta DRS_{it}}{A_{t-1}}) + \varepsilon_{it}$$

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D*\Delta DRS_{it}$	Adj-R^2
Coefficient	1431.969	0.088	-0.111	0.380	16.07%
t value	(3.410)**	(15.110)**	(-24.600)**	(2.910)**	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in net debtors for firm i in year t,
D: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the R&D/sales changes from previous period, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔDRS) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

The results show that change in sales revenue and fixed assets are significant in both models. The discretionary accruals measure is significant only when using change in debtors. This suggests that loss firms that have a changing rate of R&D spending are reversing through early sales recognition. Firms that have a constant rate of R&D spending are not manipulating since the benefits of previous R&D projects will most likely cover the current level of spending. Hence, loss firms that undertake R&D activities at a changing rate each period are more motivated to reverse through earnings management and to show profits to stay in line with the market expectations.

Same as in the UK sample, since loss firms that have a changing level of R&D spending are reversing through earnings management, the amount of change is examined to test for any differences between high change and low change R&D firms. Therefore, the firms in the US sample are divided into high change firms and low change firms. The level of change is based on whether the firm's change in R&D to sales ratio is *higher* or *lower* than the average score (0.064) of all R&D firms. The expectation is high change R&D loss firms will not have the ability to manipulate because the amount of accrual manipulation will not be sufficient enough to reverse because the amount of R&D expenses is large. On the other hand, low change R&D loss firms will have more ability to reverse through accrual manipulation. The regression results are shown in Table 5.20 when using change in stock as manipulation tool and in Table 5.21 when using change in debtors as the manipulation tool.

Table 5.20
Results of loss reversal for US firms with high change and low change in R&D with ΔSTK as manipulation tool

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_H*\Delta STK_{it}$	$D_L*\Delta STK_{it}$	Adj-R^2
Coefficient	1452.86	0.089	-0.111	-3.955	0.416	15.95%
t value	(3.45)**	(15.35)**	(-24.6)**	(-0.70)	(1.99)*	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔSTK_{it}: change in stock for firm i in year t,
D_H: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the change in R&D/sales is higher than industry average, 0 otherwise.
D_L: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the change in R&D/sales is lower than industry average, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
* t values at 5% significance level.
** t values at 1% significance level.

(D*ΔSTK) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

Table 5.21
Results of loss reversal for US firms with high change and low change in R&D with ΔDRS as manipulation tool

	$1/A_{t-1}$	ΔREV_{it}	PPE_{it}	$D_H*\Delta DRS_{it}$	$D_L*\Delta DRS_{it}$	Adj-R^2
Coefficient	1431.15	0.088	-0.111	-3.280	0.385	16.07%
t value	(3.40)**	(15.10)**	(-24.6)**	(-0.70)	(2.96)**	

TA_{it} is total accruals for firm i in year t,
ΔREV_{it}: change in sales revenue for firm i in year t,
PPE_{it}: property plant and equipment for firm i in year t,
ΔDRS_{it}: change in stock for firm i in year t,
D_H: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the change in R&D/sales is higher than industry average, 0 otherwise.
D_L: dummy variable that equals 1 if the company reports losses in previous year and profits in current year AND invests in R&D activities AND the change in R&D/sales is lower than industry average, 0 otherwise.
All variables are scaled by total assets in t-1 to reduce heteroskedasticity.
** t values at 1% significance level.
(D*ΔDRS) is the variable used as a measure for discretionary accruals for firm *i* in year *t*.

Similar to the UK sample, the results are in line with expectations. The nondiscretionary accruals variables are significant in both models. The discretionary accruals measure is significant for low change R&D loss firms and insignificant for the high change R&D loss firms. Moreover, the discretionary accruals measures in both models, for change in stock and change in debtors, are significant. This suggests that loss firms that have a low change in R&D are reversing losses through earnings management by increasing the value of stock and early recognition of sales. The low change firms are manipulating using two accrual accounts. A possible explanation is the amount of R&D is quite large even for firms with low change so they need to increase the amount of manipulation to reverse the losses. The sum of both discretionary accruals in the two models is 0.801 (0.416 + 0.385) which is the aggregate amount of required manipulation to reverse losses. In the UK sample, the amount of manipulation is 0.971 (from Table 5.16). This suggests that the amount of manipulation required to reverse losses is quite high in both samples even for firms that have a low change rate in R&D spending.

5.10 General summary on the UK and the US samples:

The results obtained from the UK and the US samples suggest that loss firms that undertake R&D projects reverse losses through earnings management. The level of manipulation varies with the changing levels in R&D spending.

Generally, companies are expected to report a loss from time to time due to different reasons. To assume they reverse to profits through earnings management after one loss period is quite a strong assumption, because they can easily report profits once the reason for losses cease to exist. However, taking into consideration that the reason for losses can linger for more than one period, companies will still continue to report losses. If the reason for losses is a specific activity that will benefit the company in the future (e.g. R&D expenses) then the company will be motivated to report profits because they expect that these activities will affect the earnings figure negatively for more than one period. On the other hand, if the reason for losses is financial or operational distress for example, then reversing through earnings management will not be helpful since the market has already evaluated these firms as distressed companies. Another reason is the scrutiny these firms face from regulatory bodies and auditors.

The results in this chapter support this argument. Loss firms that undertake R&D activities reverse to profits through earnings management. The R&D component is the underlying reason to report losses, and since the market values R&D as assets with potential future benefits, firms are motivated to show profits even through earnings management. The reason companies are motivated to show profits is to maintain the confidence of the market in the R&D activities, because if the company is undertaking R&D projects every period then they will continue to report losses. Therefore, companies will want to break the pattern of losses by reporting profits from time to time. Moreover, the market expects that benefits from previous R&D projects will pay in and if they do not see any profits any time soon they will price the R&D activities as bad investment decisions taken by company. However, if the company invests in R&D in equal proportions each period (i.e. steady investing level) then the benefits of previous R&D will most likely cover the current investment levels and they will not

need to reverse to profits through earnings management. The results support this argument; companies investing in R&D at a changing level each period reverse to profits through earnings management.

In the UK sample, results show evidence of earnings management in all loss firms that reverse to profitability. The same results are not shown in the US sample, the reason is because the percentage of R&D firms in the UK sample is 57% whereas its only 38.6% in the US sample. In other words, the majority of loss firms in the UK sample are undertaking R&D activities, but the R&D firms in the US sample are less. So, if the percentages of R&D loss firms to all other loss firms in both samples are the same, the results from both samples will be similar. Therefore, the overall conclusion from both samples is all R&D loss firms reverse to profits through earnings management, but not all loss firms. The underlying reason of losses is the main determinant in motivating managers to manipulate earnings.

When the firms are partitioned based on whether they have any change in R&D, results show evidence of earnings management for both samples. Change in R&D is defined as changing the level of R&D expenses from one period to another, regardless if the change is high or low. Results show that firms with a steady level of R&D spending (i.e. do not change amount of R&D expenses) are not reversing through earnings management. This result supports the main argument of this chapter; R&D loss firms reverse to profits through earnings management in an effort to maintain the market confidence to continue pricing the R&D as assets. Reversing to profits provides evidence to the market that some benefits of the previous R&D are paying in. Firms with changing levels in R&D will need to show profits even through earnings management because the benefits of previous R&D projects might not be sufficient to cover current levels of R&D. On the other hand, firms in a steady level of R&D investment will probably cover their current R&D expenses from the payoffs of previous R&D projects.

The loss firms with changing levels in R&D spending in both samples are further partitioned into firms with high changing levels in R&D activities and firms with low changing levels in R&D activities. High change is when a firm increases its R&D expenses in higher rate than the average R&D to sales ratio of all R&D firms. In other words, the model measures the discretionary accruals for loss firms that undertake R&D

activities at a higher changing rate than the industry's. Results from both samples did not show any evidence of earnings management in firms with high change in R&D. However, earnings management is detected in firms with low change levels in R&D spending. Low change firms have more ability to manipulate earnings successfully because the amount of R&D spending can be offset by the amount of accrual manipulation.

In the UK sample, the tool of manipulation is the stock. All significant results of the discretionary accruals measure is with change in stock. On the other hand, in the US sample the discretionary accruals measure is significant when using change in debtors. But for low change firms, both accruals are significant in the US sample. Change in stock captures overhead manufacturing costs manipulation, whereas change in debtors captures revenue manipulation through early sales recognition. Moreover, change in debtors also captures expense manipulation in the form of bad debt expense; managers can re-estimate the percentage of bad debt expanses each period based on their own discretion, however the amount manipulation could be insufficient. Overhead costs manipulation is relatively easy because it is achieved within the company and there is no need for an outside party interaction as in sales manipulation. Early sales recognition, or channel stuffing, is achieved through shipping goods early than usual to suppliers. However, it could be difficult to achieve this if the seller has less power than the buyer, or the economic situation of the buyer is poor. Difference in the manipulation tool between the two samples could be explained by which accrual account (manipulation tool) is most suitable in achieving the manipulation target. In the UK, it could be difficult, for same reason mentioned before, to ship goods early to buyers, so they manipulate overhead costs. In the US, there might be less restriction on shipping goods early to buyers, so they manipulate revenues. The overall conclusion here is any accrual account can be used to manipulate earnings, and the model developed in this research measures earnings management by specifying the accrual account used.

Overall, the results show similar patterns in the UK and the US. This could be evidence that loss reversal for R&D firms is the same in the two settings. The only difference between the UK and the US samples is the accrual account utilized to manipulate earnings (i.e. the tool of manipulation). UK firms manipulate expenses and US firms manipulate revenues. A possible explanation for this difference is the presence of higher restrictions forced by auditors or regulatory bodies on sales recognition in the UK

compared to the US. Another explanation is the ability to offer more discount promotions on early sales in the US.

5.11 Conclusion:

The focus of this chapter is to detect earnings management in loss reversal firms. The extended version of the cross-sectional Jones model is applied on two samples from the UK and the US. The model measures the normal level of accruals (nondiscretionary accruals) by the change in sales and fixed assets. Abnormal accruals (discretionary accruals) are measured only for firms that have an incentive to manipulate. The discretionary accruals are measured by a composite variable that consists of two components; the first specifies the incentive, which is loss firms that undertake R&D in this case, the other component specifies the accrual account that is most likely to be used by companies as means to manipulate.

Results show evidence of earnings management in loss reversal firms that undertake R&D projects. Since the market values these projects as assets with potential future benefits, the managers reverse to profits in order to meet with the market expectations. Managers undertake R&D investments in an attempt to increase the future value of their companies. But adopting a strategy that concentrates on R&D suggest that these companies will continue to report losses for a number of periods. Therefore, managers will aim at preserving the market's confidence in the R&D projects by showing profits from time to time, even if achieved through earnings management. If the company continues to report losses under the assumption that the market values R&D as assets, then at some point of time, the market will value R&D as bad investments decisions. The consequences will be severe for managers in this case because they will lose the justification to acquire additional funds to finance their R&D activities. Reporting profits will signal to the market that benefits of previous R&D investments are paying in, and it is a successful investment decision.

The results show that firms investing in R&D at a steady state do not manipulate since the benefits of previous R&D will probably cover the current level of investments in these projects. Companies investing in R&D at changing state reverse losses through

earnings management since the benefits of previous R&D will probably not be sufficient to cover the current level.

The results show that the tool of manipulation is different between the two samples. In the UK, the manipulation is captured by using change in stock. Firms reallocate overhead manufacturing costs to be capitalised rather than expensed to reduce cost of goods sold and therefore increasing gross profits. The manipulation of overhead manufacturing costs is achieved entirely within the firm and there is no need for an interaction with an outside party as it is required in sales manipulation. The results show no indication of sales manipulation through premature recognition of sales. However, early recognition of sales is achieved by channel stuffing and because of high competition between the UK manufactures it could be difficult to do so all the time. On the other hand, earnings management is captured mostly by change in sales in the US sample. Companies manipulate earnings through early recognition of sales by shipping goods to buyers earlier than usual.

Having different manipulation tools in each sample adds more strength to the model of this research. The model allows researchers to measure the discretionary accruals in different samples by specifying the most common and suitable accrual account to manipulate.

The overall conclusion of this chapter is the underlying reason or components of losses determine the reversion of losses through earnings management. Evidence from previous studies reveals the market interaction with the components of negative earnings. If that reason will increase the value of company in the near future, then the market will favourably value the company. Managers will want to meet this expectation by reporting profits, but in the case it is unlikely to do so, manager will report profits through earnings management.

Chapter Six

Conclusion, Limitations and Future research

6.1 Conclusion:

Applying the Jones model on cross sectional data gives unclear results. The residuals from the model are the measure for discretionary accruals. They assume that some companies are manipulating upwards and some companies are manipulating downwards, and they all average to zero.

6.1.1 Modifying the Jones model:

The Jones model is modified in this research to include an additional variable that represents discretionary accruals. The model controls for nondiscretionary accruals and measures the discretionary accrual having the residual to only represent white noise. In chapter three, simulation tests points out the major weakness of the cross-sectional version of the Jones model. When inserting a fixed amount into a dataset that does not contain earnings management, the residuals from the model did not pick the entire manipulation amount. However, when adding an additional variable to the model as a measure for discretionary accruals, the coefficient of this variable is not only significant but also equals the same amount of manipulation inserted in the dataset. Thus, the model is straight forward. Total accruals equal nondiscretionary accruals plus discretionary accruals, and if any residuals results from this model will only represent white noise. Based on that, the modification to the model overcomes the weakness of the standard model when applying it on cross-sectional data. The modified model is applied in two different settings. The first setting is applying the model on listed companies in Amman Stock Exchange (ASE). The second setting is listed companies in the UK and the US. In the both settings, the incentive to manipulate is different, but they share a common benchmark; the zero benchmark. The general objective in the three samples is to reverse losses.

6.1.2 Review of earnings management literature:

This research conducts a comprehensive review of the earnings management literature in order to examine the different methods applied in previous research, also to identify the gaps in literature. The review of earnings management literature shows that there are

different methods to detect manipulation. An important issue that various studies consider is the motivation to manipulate. The assumption is if the company is reporting profits then there is no need to manipulate. However, other studies document downward manipulation and shows different incentives that require firms to show less profits, and in some cases losses.

6.1.3 Loss reversal in ASE and market reaction:

The (ASE) has a unique market format that makes it easier to detect earnings management. The market is structured into two markets; the first market and second market. The first market contains companies that are characterised as profitable and therefore relatively less risky. Any company that reports losses for three consecutive years will be relegated and listed on the second market. Thus, the incentive is clear and evident for companies listed in the first market. Companies will aim to report profits even through manipulation in order to preserve their place in the first market. The model is applied on industrial companies listed in the first market. Results provide evidence of earnings management for industrial companies listed in the first market that report a loss in the previous period.

This research looks into the consequences of the manipulation detected in the first market on the investors. The manipulating company's share price should not include any weight for the discretionary accruals since they are a result of manager's manipulation. Additionally, they contain zero information value relating to the company's performance. However, results show that the market is pricing discretionary accruals and they consider it as a real component of earnings. As a consequence, the manipulation is achieving two goals; the company remains listed in the first market and the investor is rewarding this manipulation under the impression that the company is doing well.

6.1.4 Loss reversal in the UK and the US:

The model is also applied to detect earnings management for loss reversal firms in the UK and the US. The data is obtained from two samples of manufacturing companies listed in the UK and in the US. The incentive for these firms is to reverse the losses reported in a previous period to profits in the current period.

Results from the UK sample provide evidence of earnings management for loss reversal firms that undertake R&D activities. The incentive to manipulate is higher for loss reversal firms that have a changing state in R&D activities compared to loss reversal firms with a steady state in R&D activities. In the US sample, similar results are obtained; loss firms that undertake R&D reverse losses though earnings management. Moreover, loss firms with a changeable state in R&D activities have a higher incentive to manipulate than firms with steady level in R&D activities.

The overall conclusion from the UK and US samples is the underlying reason of the loss determines the incentive to manipulate and the amount of manipulation. R&D firms need to reverse their losses and show profits because the market is favourably pricing the R&D as assets with future benefits. The aim is to show profits to send a signal to the market that their R&D activities are in fact profitable. They can also justify the need to acquire more funds in order to finance these activities.

6.2 Contributions of this research:

The main contributions of this research are summarized as follows:

I. I develop a new model that detects and measures earnings management more accurately. The new model is based on a modification to the cross-sectional version of the Jones model. This new model uses a variable that detects manipulation and measures the amount of the manipulation for companies that share a common motivation.

II. I conduct a full review of previous research in earnings management literature. This review examines the main methods that are applied to detect earnings management. The review clusters the studies that use similar methods into three groups: studies that estimate discretionary accruals, studies that detect earnings management through earnings distribution, studies that estimate the managed component of a single accrual.

III. I provide evidence of earnings management for listed companies in Amman Stock Exchange. Industrial companies listed in the first market manipulate in order to remain listed. Moreover, I show that the market does not detect this manipulation and overreacts to the discretionary accruals.

IV. I provide evidence of earnings management for loss reversal companies that undertake R&D activities at a changing level in the UK and in the US. I show that earnings management behaviour is similar in both samples. Loss reversal through earnings management depends on whether the underlying reason for losses adds value to the company in the future.

6.3 Limitations of the research:

One of the main limitations of this study is assuming that all companies use the same tools to manipulate. In the (ASE) sample it is assumed that the change in debtors is the same tool used by all companies to manipulate. In the UK and US samples, change in stock is used as the manipulation tool in addition to change in debtors. However, each company might use different accruals accounts and methods to manipulate. This research is constrained by assuming that all firms in the same sample use the same accrual account to manipulate earnings. Some companies may use other accounts that are not necessarily related to accruals in order to manipulate, for example companies might reduce some expenditures to increase profits (i.e. real earnings management). Applying more methods of detection on the same sample could overcome this limitation.

Another limitation of this research is it did not examine explicitly the constraints that restrict the ability of managers to manipulate. For example, the role of the auditor is not taken as a factor to examine if it replaces any restrictions on the ability to manipulate. Although there is an implicit indication that all manipulators in the ASE sample has a small auditor.

Another restriction this research did not take into consideration is the issuance of new standards. For example, in chapter five, the financial statements for the UK sample is prepared under two accounting standards; the UK GAAP before 2005 and the IFRS afterwards.

In order for companies to manipulate, there should be two main factors: the incentive and the ability. In earnings management studies, the ability is associated with the availability of accounting technology (i.e. accruals). For this reason, a huge number of studies, as well as this research, include only manufacturing companies in the sample. The ability to manipulate is not necessarily associated with only accruals. Including more types of companies in the sample and examining their accounting systems will shed more light on the different methods of manipulation.

6.4 Future research:

Future research in earnings management should focus more on the restrictions placed on managers' ability to manipulate. Restrictions are a product of the surrounding environment rather than the available accounting technology.

Restrictions on the manager's ability to manipulate may be placed by new accounting standards. For example, in the UK financial statements were prepared based in the UK GAAP before 2005. After that year, companies prepared their financial reports based on the IFRS. Examining the two sets of accounting standards will provide a unique opportunity to compare the manipulation under two sets of standards for the same sample. This comparison is better than comparing two samples from different countries under different accounting regimes. Each sample operates in an environment that has its unique and distinguishable characteristics that might be unavailable or inapplicable for the other sample. Thus, motives or restrictions to manipulate could not be the same. As a consequence, the incorrect conclusion about the accounting regime is drawn, that one set of accounting standards restricts earnings management, while the actual restriction comes from a different factor.

Future research should also focus on the different accounting tools used to manipulate earnings. They should keep in mind that companies will use different tools and methods and not just one. Moreover, each company will use a different tool than others to achieve the manipulation.

A good method to apply in future research in earnings management is conducting interviews with the actual manipulators; the managers. This will provide an inside look of why managers consider manipulation as an option and how they are achieving it. Of course, such information might be very difficult to obtain because the underlying question for the manager is "how did you cheat on your financial statements!" However, maybe retired CEO's and managers could provide some inside look, or at least they can explain the old tricks used in their days.

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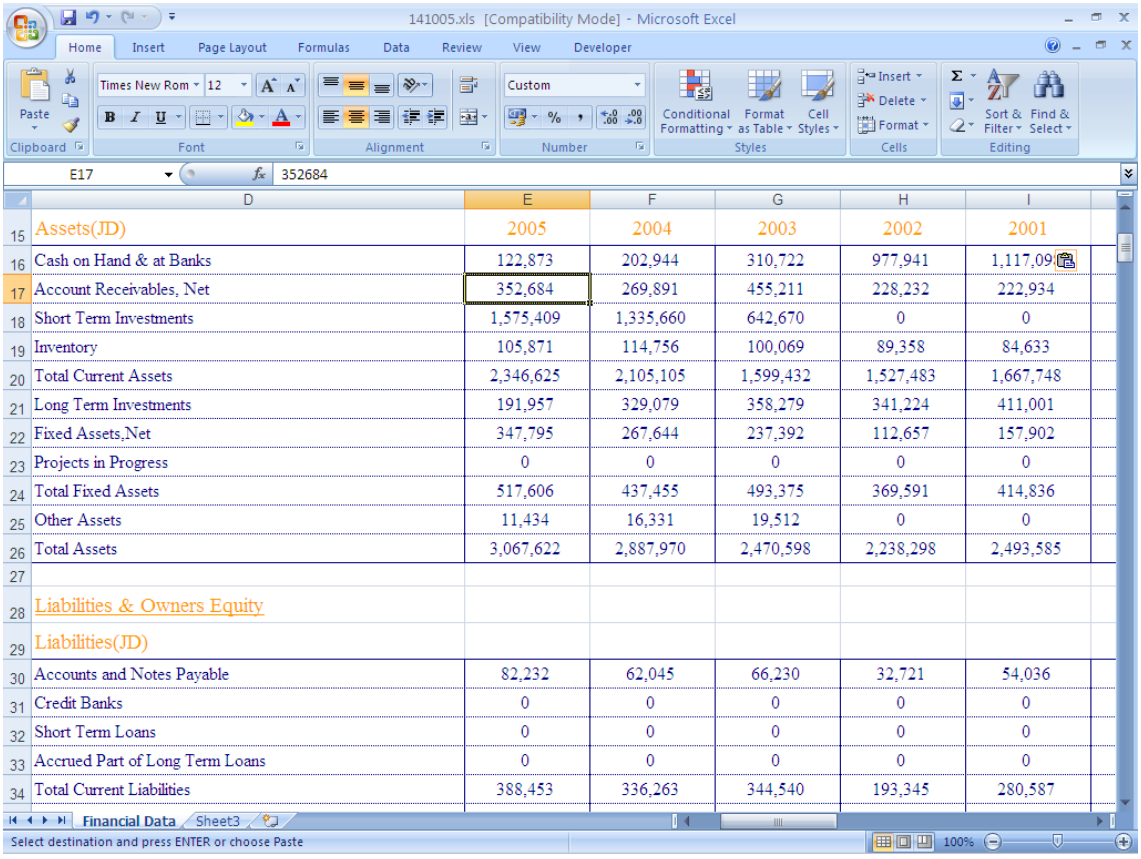
Appendix:

A1: Manipulating the data obtained from companies listed in ASE:

The data of the companies in the Amman Stock Exchange are obtained directly from the financial statements. The financial statements of each company are downloaded from the ASE website in Excel format. All financial statements are formatted in excel in a unified way; for example the cell E17 gives the accounts receivable for the year 2005. The cell E17 is accounts receivables in 2005 in all the Excel workbooks.

The following is an example of a partial view for a financial statement for one company:



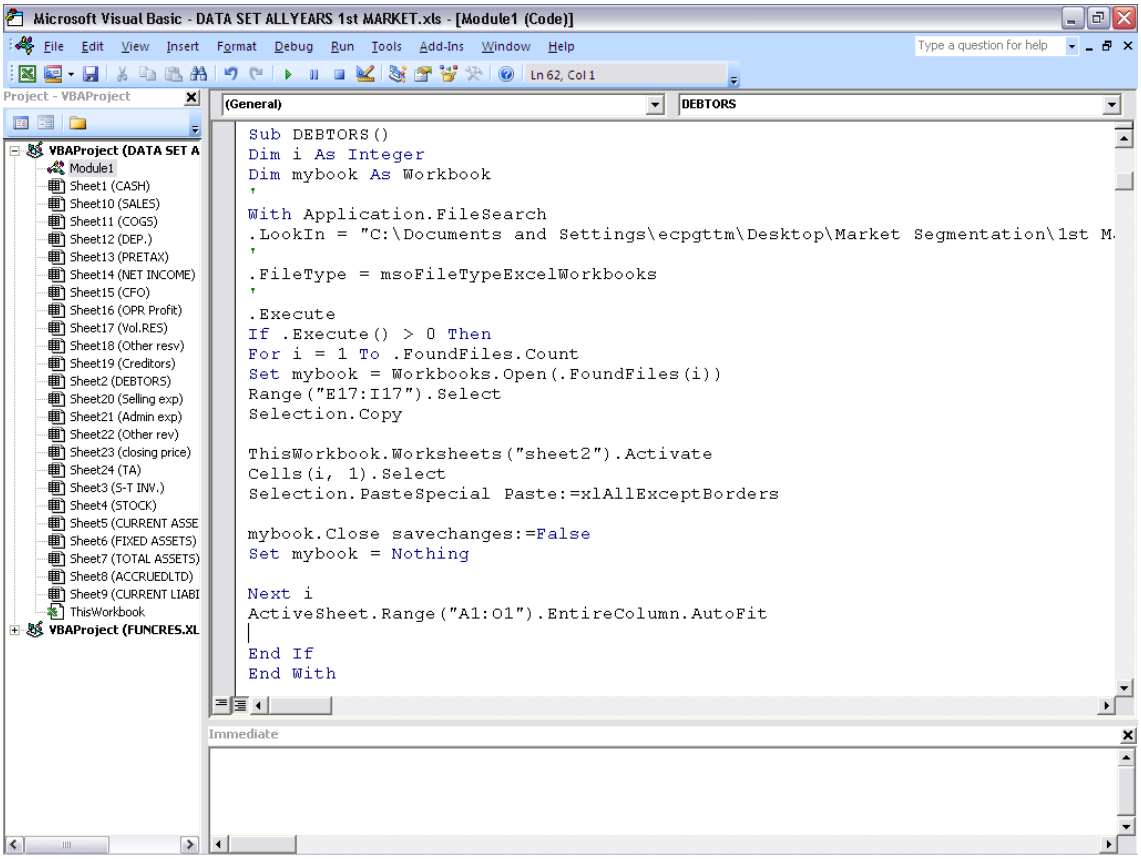
	D	E	F	G	H	I
15	Assets(JD)	2005	2004	2003	2002	2001
16	Cash on Hand & at Banks	122,873	202,944	310,722	977,941	1,117,09
17	Account Receivables, Net	352,684	269,891	455,211	228,232	222,934
18	Short Term Investments	1,575,409	1,335,660	642,670	0	0
19	Inventory	105,871	114,756	100,069	89,358	84,633
20	Total Current Assets	2,346,625	2,105,105	1,599,432	1,527,483	1,667,748
21	Long Term Investments	191,957	329,079	358,279	341,224	411,001
22	Fixed Assets,Net	347,795	267,644	237,392	112,657	157,902
23	Projects in Progress	0	0	0	0	0
24	Total Fixed Assets	517,606	437,455	493,375	369,591	414,836
25	Other Assets	11,434	16,331	19,512	0	0
26	Total Assets	3,067,622	2,887,970	2,470,598	2,238,298	2,493,585
27						
28	Liabilities & Owners Equity					
29	Liabilities(JD)					
30	Accounts and Notes Payable	82,232	62,045	66,230	32,721	54,036
31	Credit Banks	0	0	0	0	0
32	Short Term Loans	0	0	0	0	0
33	Accrued Part of Long Term Loans	0	0	0	0	0
34	Total Current Liabilities	388,453	336,263	344,540	193,345	280,587

To gather the data with total accuracy and speed and to avoid the cumbersome of copying each cell and pasting it on a new sheet, I need to write a program that can achieve this. Fortunately, Excel as well as all other Microsoft office applications, gives the option to write a program using Visual Basic for Applications (VBA).

The procedure I followed is:

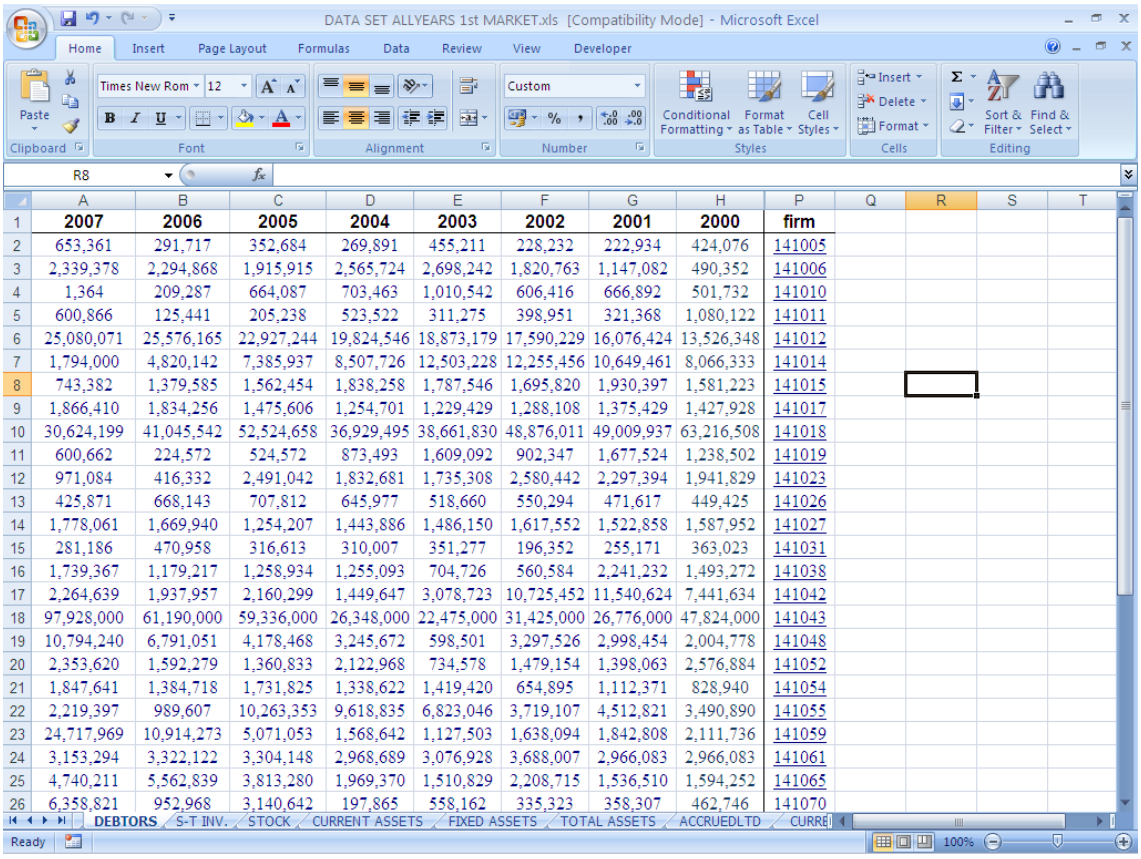
First, I downloaded the financial statements from the ASE website for each company included in the sample into one folder. This folder contains 36 Excel worksheets for each company's financial statements.

Second, I open a new worksheet to gather all the required data for the study. Within this worksheet I wrote the following program:



Basically, this program opens the folder that contains the Excel worksheet (each worksheet has the financial data for each company), then opens the first worksheet and copies the range I specify and paste it in the new worksheet. Then, it closes the worksheet and opens the second one, and so on. In this example, the range I specify is E17 to I17, so the program will copy the accounts receivables from 2001 to 2005 and paste it on the new worksheet. If I require total assets, I specify the range to be E26 to I26, so the program will copy the range and paste total assets from 2001 to 2005 in the new worksheet, and so on for all variables going through each worksheet.

The new worksheet will now contain all the variables required for each company and year included in the sample; the new worksheet will look as the following:



2007	2006	2005	2004	2003	2002	2001	2000	firm
653,361	291,717	352,684	269,891	455,211	228,232	222,934	424,076	141005
2,339,378	2,294,868	1,915,915	2,565,724	2,698,242	1,820,763	1,147,082	490,352	141006
1,364	209,287	664,087	703,463	1,010,542	606,416	666,892	501,732	141010
600,866	125,441	205,238	523,522	311,275	398,951	321,368	1,080,122	141011
25,080,071	25,576,165	22,927,244	19,824,546	18,873,179	17,590,229	16,076,424	13,526,348	141012
1,794,000	4,820,142	7,385,937	8,507,726	12,503,228	12,255,456	10,649,461	8,066,333	141014
743,382	1,379,585	1,562,454	1,838,258	1,787,546	1,695,820	1,930,397	1,581,223	141015
1,866,410	1,834,256	1,475,606	1,254,701	1,229,429	1,288,108	1,375,429	1,427,928	141017
30,624,199	41,045,542	52,524,658	36,929,495	38,661,830	48,876,011	49,009,937	63,216,508	141018
600,662	224,572	524,572	873,493	1,609,092	902,347	1,677,524	1,238,502	141019
971,084	416,332	2,491,042	1,832,681	1,735,308	2,580,442	2,297,394	1,941,829	141023
425,871	668,143	707,812	645,977	518,660	550,294	471,617	449,425	141026
1,778,061	1,669,940	1,254,207	1,443,886	1,486,150	1,617,552	1,522,858	1,587,952	141027
281,186	470,958	316,613	310,007	351,277	196,352	255,171	363,023	141031
1,739,367	1,179,217	1,258,934	1,255,093	704,726	560,584	2,241,232	1,493,272	141038
2,264,639	1,937,957	2,160,299	1,449,647	3,078,723	10,725,452	11,540,624	7,441,634	141042
97,928,000	61,190,000	59,336,000	26,348,000	22,475,000	31,425,000	26,776,000	47,824,000	141043
10,794,240	6,791,051	4,178,468	3,245,672	598,501	3,297,526	2,998,454	2,004,778	141048
2,353,620	1,592,279	1,360,833	2,122,968	734,578	1,479,154	1,398,063	2,576,884	141052
1,847,641	1,384,718	1,731,825	1,338,622	1,419,420	654,895	1,112,371	828,940	141054
2,219,397	989,607	10,263,353	9,618,835	6,823,046	3,719,107	4,512,821	3,490,890	141055
24,717,969	10,914,273	5,071,053	1,568,642	1,127,503	1,638,094	1,842,808	2,111,736	141059
3,153,294	3,322,122	3,304,148	2,968,689	3,076,928	3,688,007	2,966,083	2,966,083	141061
4,740,211	5,562,839	3,813,280	1,969,370	1,510,829	2,208,715	1,536,510	1,594,252	141065
6,358,821	952,968	3,140,642	197,865	558,162	335,323	358,307	462,746	141070

Third, now that I got the variables required for the study in one single worksheet, I can get the first difference or the scaled variable and prepare the variables to be exported to the statistical application I use.

In order to write this program, I needed to study the basic techniques of VBA. The program I wrote is applied on VBA for Excel versions from 1997 to 2003 (version 9.0 to version 11). In the new version of Excel 2007 (version 12), the object "Application.Filesearch" is hidden. Therefore, the program must be updated for the new version of Excel in order to include a new object to loop through files in the folder.

A2: list of Standard Industrial Classification for the UK and the US

The two samples for chapter five are selected from the UK and the US. The following provides the list for companies included in the both samples.

For the UK sample, manufacturing companies are included in sample with Standard Industrial Classification code from15 to 39.

UK SIC:

15. Manufacture of food products and beverages
16. Manufacture of tobacco products
17. Manufacture of textiles
18. Manufacture of wearing apparel; dressing and dyeing of fur
19. Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
20. Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
21. Manufacture of pulp, paper and paper products; publishing and printing
22. Publishing, printing and reproduction of recorded media
23. Manufacture of coke, refined petroleum products and nuclear fuel
24. Manufacture of chemicals and chemical products
25. Manufacture of rubber and plastic products
26. Manufacture of other non-metallic mineral products
27. Manufacture of basic metals
28. Manufacture of fabricated metal products, except machinery and equipment
29. Manufacture of machinery and equipment not elsewhere classified
30. Manufacture of office machinery and computers
31. Manufacture of electrical machinery and apparatus not elsewhere classified
32. Manufacture of radio, television and communication equipment and apparatus
33. Manufacture of medical, precision and optical instruments, watches and clocks
34. Manufacture of motor vehicles, trailers and semi-trailers
35. Manufacture of other transport equipment
36. Manufacture of furniture; manufacturing not elsewhere classified

For the US sample, manufacturing companies are included in sample with Standard Industrial Classification code from 20 to 39.

US SIC:

20. Food and kindred products
21. Tobacco products
22. Textile mill products
23. Apparel and other finished products made from fabrics and similar materials
24. Lumber and wood products, except furniture
25. Furniture and fixtures
26. Paper and allied products
27. Printing, publishing and allied industries
28. Chemicals and allied products
29. Petroleum refining and related industries
30. Rubber and miscellaneous plastics products
31. Leather and leather products
32. Stone, clay, glass and concrete products
33. Primary metal industries
34. Fabricated metal products, except machinery and transportation equipment
35. Industrial and commercial machinery and computer equipment
36. Electronic and other electrical equipment and components, except computer equipment
37. Transportation equipment
38. Measuring, analyzing and controlling instruments; photographic, medical and optical goods; watches and clocks
39. Miscellaneous manufacturing industries